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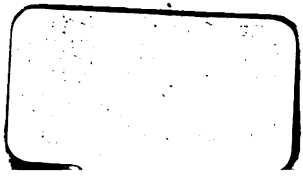
STRACHAN'S
MENTAL
ARITHMETIC



MENTAL ARITHMETIC;

OR,

A CONCISE SYSTEM

OF

COMMERCIAL ARITHMETIC,

BY

JAMES STRACHAN, F.E.I.S.,

TEACHER OF ARITHMETIC, &c., MILNE'S FREE SCHOOL, FOCHABERS, AUTHOR OF "INTRODUCTION TO ARITHMETIC, &c., &c.

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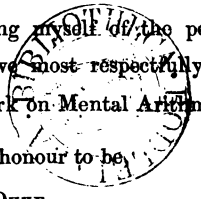
HIS GRACE THE DUKE OF RICHMOND,

CHANCELLOR OF MARISCHAL COLLEGE, ABERDEEN,
AND PRINCIPAL DIRECTOR OF MILNE'S
FREE SCHOOL, FOCHABERS.

My Lord Duke,

Availing myself of the permission so kindly given, I now beg leave most respectfully to dedicate to your Grace this little Work on Mental Arithmetic.



And, I have the honour to be,

My Lord Duke,

Your Grace's much obliged,

And very humble Servant,

JAMES STRACHAN.

INTRODUCTION.

THE study of MENTAL ARITHMETIC is but little attended to in most of our Educational Institutions in Scotland, and, notwithstanding the many excellent works now published on Arithmetic, few of them treat of this branch of the Science as its importance deserves, and this is, it may be presumed, one reason that it has not been more generally introduced as a part of the regular routine in the Study of Arithmetic.

It is well known to every one in business, that a shorter method of computing is indispensable, than that with which the youth, who has just finished his arithmetical studies, is acquainted; hence every one is entirely left to contrive for himself some more expeditious method of computing; the method thus acquired will, in all probability, be kept as a secret or mystery. Now, were the study of Mental Arithmetic more generally attended to in schools, young men would be found much better qualified for entering the shop, counting-house, bank, or any other situation where expertness in calculating is an essential recommendation. Nor is it only to those so employed that a knowledge of Mental Arithmetic is of any importance, there being few, if any, of either sex in any situation to whom a short and simple method of calculating will not at times be of considerable importance, as many occasions occur when there is neither time nor means at hand for the ordinary tedious methods.

It is with a view to facilitate the study of this branch of the Science of Arithmetic that the following pages have been prepared, not only to furnish a simple and concise system of Mental Arithmetic, but also methods by which computations may be performed more expeditiously and with less risk of error than by the common rules.

J. S.

Fochabers, 1852.

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MENTAL ARITHMETIC.

MENTAL EXERCISES IN ADDITION.

Required the sum of			3,	2, and 4,	=	9
,,	,,		4,	3, and 5,	=	12
,,	,,		5,	3, and 7,	=	15
,,	,,		2,	4, and 6,	=	12
,,	,,		3,	5, and 7,	=	15
,,	,,		4,	6, and 5,	=	15
,,	,,		3,	9, and 4,	=	16
,,	,,		6,	7, and 5,	=	18
,,	,,		5,	9, and 7,	=	21
,,	,,		7,	8, and 6,	=	21
,,	,,		8,	5, and 9,	=	22
,,	,,		3,	7, and 8,	=	18
,,	,,		4,	9, and 8,	=	21
,,	,,		7,	8, and 9,	=	24
,,	,,	3,	2,	4, and 5,	=	14
,,	,,	4,	3,	6, and 1,	=	14
,,	,,	3,	5,	4, and 2,	=	14
,,	,,	4,	3,	5, and 4,	=	16
,,	,,	6,	5,	3, and 5,	=	19
,,	,,	4,	8,	6, and 7,	=	25
,,	,,	5,	9,	3, and 8,	=	25
,,	,,	7,	8,	6, and 9,	=	30
,,	,,	8,	5,	9, and 4,	=	26
,,	,,	9,	7,	6, and 8,	=	30
,,	,,	8,	9,	7, and 10,	=	34
,,	,,	7,	8,	11, and 9,	=	35
,,	,,	6,	10,	9, and 8,	=	33
,,	,,	14,	7,	8, and 6,	=	35
,,	,,	17,	7,	9, and 9,	=	42
,,	,,	11,	12,	9, and 7,	=	39

MENTAL EXERCISES IN ADDITION AND SUBTRACTION

From the sum of 3, 4, and 2, take 1, = 8
„ „ 4, 3, and 6, take 5, = 8
„ „ 5, 3, and 7, take 4, = 11
„ „ 4, 7, and 6, take 3, = 14
„ „ 6, 4, and 8, take 5, = 13
„ „ 7, 9, and 4, take 8, = 12
„ „ 8, 7, and 6, take 9, = 12
„ „ 9, 8, and 5, take 7, = 15
„ „ 6, 7, and 9, take 8, = 14
„ „ 8, 5, and 7, take 4, = 16
„ „ 7, 6, and 11, take 9, = 15
„ „ 9, 8, and 12, take 11, = 18
„ „ 7, 4, and 13, take 10, = 14
„ „ 8, 11, and 10, take 9, = 20
„ „ 10, 5, and 9, take 7, = 17
„ „ 8, 12, and 8, take 11, = 17
„ „ 9, 11, and 7, take 10, = 17
„ „ 8, 7, and 13, take 5, = 23
„ „ 12, 5, and 9, take 7, = 19
„ „ 14, 7, and 8, take 9, = 20
„ „ 13, 9, and 5, take 7, = 20

From the sum of 4, 5, and 9, take the sum of 2 and 3, = 13
„ „ 7, 4, and 3, „ „ 3 and 4, = 7
„ „ 6, 3, and 8, „ „ 5 and 4, = 8
„ „ 8, 4, and 6, „ „ 5 and 3, = 10
„ „ 7, 5, and 9, „ „ 4 and 7, = 10
„ „ 9, 4, and 7, „ „ 5 and 6, = 9
„ „ 8, 7, and 9, „ „ 4 and 7, = 13
„ „ 11, 9, and 8, „ „ 7 and 6, = 15

Another method of exercising a Junior Class on Addition and Subtraction :—Let the one either at the foot or top of the class be desired to add 2, or any other number to 2, or to any other number, and when answered by the one at the foot or top, make the next one repeat the sum; thus suppose the answer to be 4, then the next one says 4 and 2 (supposing 2 the number to be added) are 6; the

next one says 6 and 2 are 8, and so on till the whole class add 2 to the original number—this done, begin at the top, and request the one at the top to subtract 2 from the sum; the next one 2 from the remainder, and so on through the whole class. This exercise may also be performed by each one mentioning only the sum, thus supposing a class requested to add 3 to 2; the first; say the one at the foot, says 5; the next, 8; the next, 11; &c.

Such Exercises will in general be found to command the attention of the whole class, and the want of it can scarcely escape detection.

The following method of exercising a Class, on the Black-board, or Slate, will be found to save time:—

23433
34214
57647
115294
230588
461176
922352
461176
461176
230588
230588
115294
115294
&c.

First write 23433, as in the example in the margin, and under it any other number, as 34214, (only it is best to notice that their sum does not run into ciphers at the first, because it would then be almost no exercise); then add them, and write their sum directly under the numbers added, then add their sum and the numbers above it, as is done in the example in the margin; continue this to any length, then commence and subtract the last found sum but one from the last—the sum above that from the remainder, and so on till they are all subtracted. The number may be written under that from which it is to be subtracted, as is done in the margin; or the operation may be performed with the figures where they stand, and the remainders only written down.

TABLE OF MULTIPLCATION EXTENDED.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260
14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300
16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340
18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360
19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	328	342	361	380
20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

That portion of the above Table enclosed by the dark lines, should be accurately committed to memory, and those who can should get the whole of it.

MENTAL EXERCISES IN SIMPLE MULTIPLICATION AND SIMPLE DIVISION.

Multiply 13 by 2 = 26 Multiply 18 by 7 = 126

14 * 2 = 28	19 × 8 = 152
14 × 3 = 42	19 × 9 = 171
15 × 4 = 60	19 × 10 = 190
17 × 3 = 51	20 × 11 = 220
16 × 4 = 64	23 × 5 = 115
18 × 5 = 90	24 × 6 = 144
18 × 6 = 108	25 × 7 = 175
19 × 4 = 76	28 × 6 = 168
19 × 5 = 95	31 × 8 = 248
19 × 7 = 133	34 × 9 = 306
20 × 4 = 80	41 × 8 = 328
21 × 7 = 147	43 × 9 = 387
22 × 8 = 176	52 × 12 = 624

Divide the following numbers by their respective divisors mentally, and mention the number of times which the *Divisor* is contained in the *Dividend* and the remainder, if any :—

24 † 3 = 8	29 ÷ 9 = 3^2	57 ÷ 9 = 6^3
25 ÷ 3 = 8^1	42 ÷ 14 = 3	69 ÷ 12 = 5^9
24 ÷ 5 = 4^4	56 ÷ 14 = 4	76 ÷ 14 = 5^6
27 ÷ 9 = 3	84 ÷ 7 = 12	89 ÷ 14 = 6^5
28 ÷ 4 = 7	97 ÷ 12 = 8^1	97 ÷ 16 = 6^1
31 ÷ 6 = 5^1	98 ÷ 9 = 10^8	108 ÷ 15 = 7^3
43 ÷ 8 = 5^3	72 ÷ 9 = 8	124 ÷ 12 = 10^4
48 ÷ 6 = 8	64 ÷ 16 = 4	155 ÷ 14 = 11^1
51 ÷ 8 = 6^3	88 ÷ 9 = 9^7	172 ÷ 8 = 21^4
54 ÷ 9 = 6	99 ÷ 14 = 7^1	252 ÷ 12 = 21

* The sign of Multiplication, and when placed between two numbers signifies that the one is to be multiplied by the other.

† The sign of Division, and when placed between two numbers, signifies that the former is to be divided by the latter.

ARITHMETICAL TABLES.

STERLING MONEY.

4 Farthings	=	1 Penny.	*d.*
12 Pence	=	1 Shilling.	*s.*
20 Shillings	=	1 Pound.	£

Two shillings and sixpence make half-a-crown; five shillings make one crown; twenty shillings make one sovereign; twenty-one shillings make one guinea.

TROY WEIGHT.

24 Grains (gr.)	=	1 Penny-weight.	dwt.
20 Penny-weights	=	1 Ounce.	oz.
12 Ounces	=	1 Pound.	lb.

By this weight, silver, gold, and jewels are weighed.

APOTHECARIES' WEIGHT.

20 Grains (gr.)	=	1 Scruple.	scr.
3 Scruples	=	1 Dram.	dr.
8 Drams	=	1 Ounce.	oz.
12 Ounces	=	1 Pound.	lb.

This weight is used only by Apothecaries for compounding their medicines. It is the same as Troy Weight, only the sub-divisions are different.

AVOIRDUPOIS WEIGHT.

16 Drams (dr.)	=	1 Ounce	oz.
16 Ounces	=	1 Pound	lb.
14 Pounds	=	1 Imp. Stone	Imp. st.
28 Pounds	=	2 Quarter	qr.
4 Quarters, or 112lb.	=	1 Hundred-wht.	Cwt.
20 Hundred-weights	=	1 Ton	T.

All grocery goods, meal, butter, cheese, &c., are weighed by this weight. 144 lbs. Avoirdupois = 175 lbs. Troy.

LONG MEASURE.

12	Inches (in.)	=	1 Foot	ft.
3	Feet	=	1 Yard	yd.
5½	Yards	=	1 Pole	po.
40	Poles, or 220 yds.	=	1 Furlong	fur.
8	Fur., or 1760 yds.	=	1 Mile	ml.
3	Miles	=	1 League	

60 geographical miles, or 69 $\frac{1}{11}$ British miles, one degree; 7 yards, one Irish pole; 11 Irish miles are equal to 14 English miles; 4 inches make one hand, used for measuring the height of horses.

CLOTH MEASURES.

2¼	Inches (in.)	=	1 Nail	nl.
4	Nails	=	1 Quarter	qr.
4	Quarters	=	1 Yard	yd.

5 quarters = 1 English ell; 6 quarters = 1 French ell; 3 quarters = 1 Flemish ell; 37* inches = 1 Scotch ell, nearly.

* The Scotch ell is a small fraction more than 37 inches.

SQUARE, OR LAND MEASURE.

144	Square inches	=	1 Square foot	sq. ft.
9	Square feet	=	1 Square yard	sq. yd.
30¼	Square yards	=	1 Square pole	sq. po.
40	Square poles	=	1 Rood	ro.
4	Roods	=	1 Acre	ac.

One square mile contains 640 imperial acres. The imperial chain used for measuring land is 66 feet, or 22 yards long; it is divided into 100 equal links; 10 chains in length and 1 in breadth make 1 imperial acre; 36 square yards are 1 rood of mason work; 100 square feet are 1 square of flooring.

SOLID OR CUBIC MEASURE.

1728	Cubic inches	=	1 Cubic or solid foot.
27	Cubic feet	=	1 Cubic yard.

By this wood, stone, &c., are measured.

LIQUID MEASURE, OR MEASURE OF CAPACITY.

9.16480625	Solid inches	= 1	Gill	gl.
4	Gills	= 1	Pint	pt.
2	Pints	= 1	Quart	qt.
4	Quarts	= 1	Gallon	gal.
63	Gallons	= 1	Hogshead	hhd.
2	Hogsheads	= 1	Pipe or butt	p.
2	Pipes	= 1	Tun	T.

This is used for measuring all liquids.

DRY MEASURE OR MEASURE OF CAPACITY.

34.659225	Cubic inches	= 1	Pint	pt.
2	Pints	= 1	Quart	qt.
4	Quarts	= 1	Gallon	gal.
2	Gallons	= 1	Peck	pk.
4	Pecks	= 1	Bushel	bush.
8	Bushels	= 1	Quarter	qr.

This is the only measure allowed by law for all dry goods.

TABLE OF TIME.

60	Seconds (sec.)	= 1	Minute	min.
60	Minutes	= 1	Hour	ho.
24	Hours	= 1	Day	da.
365¼	Days	= 1	Julian year	Y.

7 days = 1 week; 4 weeks = 1 lunar month; 365 days = 1 leap year; 365 days, 5 hours, 48 minutes, 49 $\frac{7}{10}$ seconds = 1 solar year. The year is divided into 12 calendar months.

12	Articles	= 1	Dozen	doz.
20	Articles	= 1	Score	sc.
144	Articles, or 12 doz	= 1	Gross	gr.
24	Sheets of paper	= 1	Quire	qr.
20	Quires	= 1	Ream	rm.

QUARTERLY TERMS.

In Scotland.		*In England.*	
1. Candlemas	2 February	1. Lady-day	25 March
2. Whitsunday	15 May	2. Midsummer	24 June
3. Lammas	1 August	3. Michaelmas	29 Sept.
4. Martinmas	11 Nov.	4. Christmas	25 Dec.

As it will be found, in calculating the value of any quantity or number of articles mentally, when the price of one of these consists of shillings, pence, &c., or pounds, shillings, pence, &c., most readily performed by making the lower denominations in the price a fraction of the highest. The following Table should therefore be committed to memory:—

d.		*s.*	*d.*		*s.*
1	equal to	1-12th	6½	equal to	13-24ths
1¼	„	5-48ths	6¾	„	9-16ths
1½	„	1-8th	7	„	7-12ths
1¾	„	7-48ths	7¼	„	29-48ths
2	„	1-6th	7½	„	5-8ths
2¼	„	3-16ths	7¾	„	31-48ths
2½	„	5-24ths	8	„	2-3ds
2¾	„	11-48ths	8¼	„	11-16ths
3	„	1-4th	8½	„	17-24ths
3¼	„	13-48ths	8¾	„	35-48ths
3½	„	7-24ths	9	„	3-4ths
3¾	„	5-16ths	9¼	„	37-48ths
4	„	1-3d	9½	„	19-24ths
4¼	„	17-48ths	9¾	„	13-16ths
4½	„	3-8ths	10	„	5-6ths
4¾	„	19-48ths	10¼	„	41-48ths
5	„	7-12ths	10½	„	7-8ths
5¼	„	7-16ths	10¾	„	43-48ths
5½	„	11-24ths	11	„	11-12ths
5¾	„	23-48ths	11¼	„	15-16ths
6	„	1-half	11½	„	23-24ths
6¼	„	25-48ths	11¾	„	47-48ths

s.	d.		£	s.	d.		£
1	0	equal to	1-20th	8	4	equal to	5-12ths
1	3	„	1-16th	9	0	„	9-20ths
1	4	„	1-15th	10	0	„	1-half
1	8	„	1-12th	10	6	„	21-40ths
2	0	„	1-10th	11	0	„	11-20ths
2	6	„	1-8th	12	0	„	3-5ths
3	4	„	1-6th	12	6	„	5-8ths
3	8	„	11-60ths	13	4	„	2-3ds
4	0	„	1-5th	14	0	„	7-10ths
4	8	„	7-30ths	15	0	„	3-4ths
5	0	„	1-4th	15	6	„	31-40ths
5	6	„	11-40ths	16	8	„	5-6ths
6	4	„	19-60ths	17	6	„	7-8ths
6	8	„	1-3d	18	0	„	9-10ths
7	6	„	3-8ths	18	4	„	11-12ths

When the shillings, pence, and farthings, in the price of any article, are not to be found in the above Table, their aliquot part, or parts of one pound, may thus be found: Reduce the shillings, pence, &c., to the lowest denomination in the given price, and £1. to the same denomination—Thus: to find what fraction 5s. 7½d. is of one pound: Reduce both to half-pence, and write the half-pence in 5s. 7½d. above the half-pence in one pound, with a line between them, which will be the fraction that 5s. 7½d. is of £1.; the half-pence in 5s. 7½d. is 135, and in £1. there are 480, hence 5s. 7½d. is 135-480th of £1, or 9-32; this last fraction is got by dividing both parts of the first fraction by 15, which does not alter the value of the fraction.

MENTAL EXERCISES IN REDUCTION.

1.—REDUCE MENTALLY FARTHINGS TO PENCE, &c.

Farthings.		d.	Farthings.		d.
5	equal to	$1\frac{1}{4}$	28	equal to	7
6	„	$1\frac{1}{2}$	30	„	$7\frac{1}{2}$
7	„	$1\frac{3}{4}$	33	„	$8\frac{1}{4}$
8	„	2	36	„	9
9	„	$2\frac{1}{4}$	37	„	$9\frac{1}{4}$
10	„	$2\frac{1}{2}$	39	„	$9\frac{3}{4}$
11	„	$2\frac{3}{4}$	40	„	10
12	„	3	42	„	$10\frac{1}{2}$
15	„	$3\frac{3}{4}$	43	„	$10\frac{3}{4}$
16	„	4	45	„	$11\frac{1}{4}$
19	„	$4\frac{3}{4}$	46	„	$11\frac{1}{2}$
25	„	$6\frac{1}{4}$	47	„	$11\frac{3}{4}$

2.—REDUCE MENTALLY PENCE TO SHILLINGS, &c.

d.		s.	d.	d.		s.	d.
96	equal to	8	0	180	equal to	15	0
99	„	8	3	240	„	20	0
108	„	9	0	267	„	22	3
125	„	10	5	360	„	30	0
119	„	9	11	386	„	32	2
129	„	10	9	397	„	33	1
132	„	11	0	405	„	33	9
156	„	13	0	564	„	47	0
121	„	10	1	804	„	67	0
137	„	11	5	598	„	49	10
140	„	11	8	803	„	25	3
149	„	12	5	79	„	6	7
150	„	12	6	674	„	56	2

3.—REDUCE MENTALLY SHILLINGS TO POUNDS, &c.

Shillings.		£	s.	Shillings.		£	s.
40	equal to	2	0	300	equal to	15	0
52	,,	2	12	402	,,	20	2
60	,,	3	0	436	,,	21	16
69	,,	3	9	472	,,	23	12
87	,,	4	7	490	,,	24	10
95	,,	4	15	514	,,	25	14
100	,,	5	0	600	,,	30	0
127	,,	6	7	619	,,	30	19
145	,,	7	5	740	,,	37	0
160	,,	8	0	765	,,	38	5
197	,,	9	17	770	,,	38	10
204	,,	10	4	801	,,	40	1

Such exercises as the following might occasionally be proposed to junior classes, the reason for recommending such, and the advantage to be derived from them, by the tyro, must appear evident to every unprejudiced mind.

EXAMPLES.

1. Suppose one sent to a shop with 1 crown, and that he purchases various articles which amount to 3s. 4d., how much should he receive back of his crown? Ans. 1s. 8d.

2. Suppose one to be due to another 2s. 6d., and to pay at one time 10d., at another time 1s. 2d., and at a third time 4d., what is he due? Ans. 2d.

3. How many poor could be supplied with 8d., each, out of 12s. Ans. 18.

To find the value of any number of articles when the price of one does not exceed 11$\frac{3}{4}$d.

First.—When the price is pence—find the amount of the number of articles at 1d., and multiply it by the number of pence in the given price.

EXAMPLES.

What will 49 yards cost at 7d. per yard?

Thus, 49 yards at 1d., is £0 4 1
7

£1 8 7 Ans.

What will 168 yards cost at 9d. per yard?

168, at 1d. is £0 14 0
9

£6 6 0 Ans.

What will 1 cwt. of sugar cost at 6d per lb?

cwt. lb.
1 = 112, and 112 at 1d. is £0 9 4
6

£2 16 0 Ans.

What will 100 dozen of eggs amount to, 5d. per dozen?

100 at 1d. is £0 8 4
5

£2 1 8 Ans.

What will 154 cwt. of coals amount to 9d. per cwt?

154 at 1d. is £0 12 10
9

£5 15 6 Ans.

What will 172 lbs. amount to at 7d. per lb.?

Ans. £5 0 4

What will 96 oz. cost at 5d. per ounce?

Ans. £2

What will 132 lbs. of sugar amount to at 7d. per lb.?

Ans. £3 17 0

What will a man's wages amount to in 20 weeks, of 6 days each, at 9d. per day?

20 weeks, of 6 days each, = 120 days.

120 at 1d. is £0 10 0

9

£4 10 0 Ans.

What will 176 pairs of stockings amount to at 9d. per pair?

176, at 1d., is £0 14 8

9

£6 12 0 Ans.

What will 721 stones of hay amount to at 7d. per stone?

Ans. £21 0 7

24 yards at 3d.	£0	6	0	36 yards at 3d.	£
28 „ „ 4d.	0	9	4	38 „ „ 3d.	
32 „ „ 5d.	0	13	4	42 „ „ 4d.	
38 „ „ 6d.	0	19	0	47 „ „ 4d.	
41 „ „ 6d.	1	0	6	51 „ „ 5d.	
50 „ „ 7d.	1	9	2	57 „ „ 6d.	
68 „ „ 7d.	1	19	8	65 „ „ 7d.	
42 lbs. „ 8d.	1	8	0	44 lbs. „ 7d.	
73 „ „ 9d.	2	14	9	56 „ „ 8d.	
85 „ „ 9d.	3	3	9	84 „ „ 9d.	
98 „ „ 10d.	4	1	8	89 „ „ 10d.	
112 „ „ 10d.	4	13	4	112 „ „ 10d.	
180 „ „ 11d.	8	5	0	144 „ „ 11d.	
183 „ „ 11d.	8	7	9	158 „ „ 11d.	

£35 6 2

Second.—When the price consists of pence and farthings, or any other fraction of a penny.

Find the amount of the number of articles at the pence by the last rule, to which, add the same part of their value at 1d., as the fraction in the price is of 1d.

EXAMPLES.

What will be the amount of 36 yards, at $3\frac{1}{4}$d. per yard?—Thus,

36 yards, at 1d., is £0 3 0 — Add 9d. = $\frac{1}{4}$ of 3s. when multiplying by 3.
$3\frac{1}{4}$

Ans. £0 9 9

Or,

£0 3 0
$3\frac{1}{4}$

0 9 0
$\frac{1}{4}$ of 3s. = 9

£0 9 9 Ans.

What will 49 yards amount to at $5\frac{1}{2}$d. per yard?

49, at 1d., is £0 4 1 — Add 2s. 0$\frac{1}{2}$d., = $\frac{1}{2}$ of 4s. 1d. when multiplying by 5.
$5\frac{1}{2}$

Ans. £1 2 $5\frac{1}{2}$

What will 1 cwt. of sugar amount to at $5\frac{1}{8}$d. per lb?

1 cwt = 112 lbs. and 112, at 1d., is £0 9 4
$5\frac{1}{8}$

Ans. £2 7 10

What will 56 oz. amount to at $3\frac{1}{4}$d. per oz.?

Ans. £0 15s. 2d.

What will 87 yards cost at $7\frac{1}{2}$ per yard?

Ans. £2 14 $4\frac{1}{2}$

What will 128 stones of hay cost at $6\frac{3}{4}$d. per stone?

Ans. £3 12s.

What will 147 yards cost at $7\frac{1}{8}$d per yard?
Ans. £4 7s. $3\frac{3}{8}$d., or £4 7s. $3\frac{1}{4}$d. $\frac{1}{8}$.

What will 201 pair of buckles amount to at $9\frac{5}{8}$d per pair?

201, at 1d., is	£0	16	9	Add 10s. $5\frac{5}{8}$d. $= \frac{5}{8}$ of 16s.
			$9\frac{5}{8}$	9d when multiplying by 9.
Ans.	£8	1	$2\frac{5}{8}$	

Or, When the upper figure of the fraction exceeds 1, the operation may, if considered, preferable or easier, be performed as follows:—

201, at 1d., is	£0	16	9
			$9\frac{5}{8}$
	8)4	3	9
Price of 201 at $\frac{5}{8}$d.	0	10	$5\frac{5}{8}$
Do. of 201 at 9d.	7	10	9
Ans.	£8	1	$2\frac{5}{8}$, or £8 1 $2\frac{1}{2}$. $\frac{1}{8}$

What will 304 yards amount to at 7d. $\frac{1}{16}$ per yard?
Ans. £8 18s. 11d.

What will 1121 stones of hay amount to at 5d. $\frac{5}{16}$ per stone? Ans. £24 16s. $3\frac{1}{4}$d. $\frac{1}{4}$

What will 56 lbs. amount to at 7d. $\frac{6}{12}$ per lb.?
Ans. £1 14s. $7\frac{1}{3}$d.

What will 120 lbs. amount to at $9\frac{5}{8}$d. per lb.?
Ans. £4 16s. 3d.

What will 151 lbs. cost at 8d. $\frac{7}{12}$ per lb.?
Ans. £5s. 8s. 0d. $\frac{1}{12}$.

What will 240 lbs. cost at $9\frac{1}{8}$d?
Ans. £9 2s. 6d.

27	yds.	at	$2\frac{1}{4}$d.	£0	5	$0\frac{3}{4}$	25	lbs.	at	$2\frac{1}{2}$d.
32	„	„	$2\frac{1}{2}$d.	0	6	8	33	„	„	$3\frac{1}{4}$d.
39	„	„	$2\frac{3}{4}$d.	0	8	$11\frac{1}{4}$	49	„	„	$3\frac{3}{4}$d.
41	„	„	$3\frac{1}{4}$d.	0	11	$1\frac{1}{4}$	53	„	„	$4\frac{1}{4}$d.
45	„	„	$4\frac{1}{4}$d.	0	16	$10\frac{1}{2}$	65	„	„	$5\frac{3}{4}$d.
67	„	„	$5\frac{3}{4}$d.	1	12	$1\frac{1}{2}$	87	„	„	$6\frac{1}{4}$d.
74	„	„	$6\frac{1}{4}$d.	1	18	$6\frac{1}{2}$	98	„	„	$6\frac{3}{4}$d.
81	„	„	$7\frac{1}{4}$d.	2	10	$7\frac{1}{2}$	112	„	„	$8\frac{1}{2}$d.
88	„	„	$8\frac{3}{4}$d.	3	4	2	115	„	„	$8\frac{3}{4}$d.
97	„	„	$10\frac{1}{2}$d.	4	4	$10\frac{1}{2}$	135	„	„	$9\frac{1}{8}$d.
102	„	„	$11\frac{1}{4}$d.	4	15	$7\frac{1}{2}$	145	„	„	$7\frac{5}{8}$d.
125	„	„	$11\frac{3}{4}$d.	6	2	$4\frac{3}{4}$	191	„	„	$8\frac{3}{8}$d.
48	„	„	$3\frac{1}{8}$d.	0	12	6	187	„	„	$9\frac{3}{8}$d.
76	„	„	$4\frac{3}{8}$d.	1	7	$8\frac{1}{2}$	243	„	„	$9\frac{3}{16}$d.
96	„	„	$5\frac{3}{8}$d.	2	4	$9\frac{3}{8}$	89	„	„	$10\frac{1}{8}$d.
112	„	„	$6\frac{3}{8}$d.	2	19	6	97	„	„	$10\frac{7}{8}$d.
147	„	„	$6\frac{7}{8}$d.	4	4	$2\frac{5}{8}$	176	„	„	$11\frac{1}{4}$d.
180	„	„	$4\frac{1}{16}$d.	3	0	$11\frac{1}{4}$	189	„	„	$11\frac{1}{2}$d.
216	„	„	$5\frac{3}{16}$d.	4	13	$4\frac{1}{2}$	276	„	„	$11\frac{5}{8}$d.
145	„	„	$9\frac{9}{16}$d.	5	15	$6\frac{9}{16}$	360	„	„	$11\frac{9}{16}$d.

£106 9 $10\frac{9}{4}$ $\frac{11}{16}$

When the quantity or the number of articles contains a fraction :—

RULE.—First find the amount of the quantity or number of articles at 1d., neglecting the fraction, then to the amount at 1d., add the same part or parts of 1d. that the fraction is of one of the articles; their sum, multiplied by the number of pence in the price, will be the answer.

EXAMPLES.

What will $25\frac{1}{2}$ lbs. amount to at 6d. per lb. ?

$25\frac{1}{2}$ lbs., at 1d., is	£0	2	$1\frac{1}{2}$	The price of 25 lbs.
			6	at 1d., is 2s. 1d., to
				which is added $\frac{1}{2}$d.
Ans.	£0	12	9	for the $\frac{1}{2}$ lb., which
				makes 2s. $1\frac{1}{2}$d.

And 2s. $1\frac{1}{2}$d., multiplied by 6, the number of pence in the price, gives the amount of $25\frac{1}{2}$ lbs., at 6d. per lb.

What will $49\frac{1}{4}$d yards amount to at 7d. per yard.

$49\frac{1}{4}$, at 1d., is £0 4 $1\frac{1}{4}$

7

Ans. £1 8 $8\frac{3}{4}$

What will $57\frac{5}{8}$ yards amount to at 8d. per yard?

$57\frac{5}{8}$, at 1d., is £0 4 $9\frac{5}{8}$

8

Ans. £1 18 5

What will $122\frac{3}{16}$ yards cost at 9d per yard?

$122\frac{3}{16}$, at 1d, is £0 10 $2\frac{3}{16}$

9

Ans. £4 11 $7\frac{11}{16}$ or, £4 11 $7\frac{1}{2}$ $\frac{3}{4}$

What will $152\frac{5}{16}$ yards of ribbon cost at 7d. per yard?

$152\frac{5}{16}$ at 1d. is £0 12 $8\frac{5}{16}$

7

Ans. £4 8 $10\frac{3}{16}$

What will $367\frac{7}{16}$ stones of hay amount to at 8d. per stone?

$367\frac{7}{16}$, at 1d., is £1 10 $7\frac{7}{16}$

8

Ans. £12 4 $11\frac{8}{16}$ or, £12 4 $11\frac{1}{2}$.

What will $1045\frac{5}{12}$ lbs. amount to at 9d. per lb.?

$10451\frac{5}{12}$, at 1d. is £4 7 $1\frac{5}{12}$

9

Ans. £39 4 $0\frac{9}{12}$ or, £39 4 $0\frac{3}{4}$

$24\frac{1}{4}$	yds. at	2d.	£0	4	$0\frac{1}{4}$	$34\frac{1}{8}$	lbs. at	4d.	£	
$28\frac{1}{2}$	„ „	3d.	0	7	$1\frac{1}{2}$	$43\frac{5}{8}$	„ „	5d.		
$34\frac{3}{4}$	„ „	4d.	0	11	7	$54\frac{5}{8}$	„ „	5d.		
$37\frac{1}{8}$	„ „	5d.	0	15	$5\frac{5}{8}$	$59\frac{3}{4}$	„ „	6d.		
$54\frac{3}{8}$	„ „	5d.	1	2	$7\frac{7}{8}$	$65\frac{1}{16}$	„ „	7d.		
$75\frac{5}{8}$	„ „	6d.	1	17	$9\frac{3}{4}$	$68\frac{5}{12}$	„ „	7d.		
$83\frac{7}{8}$	„ „	6d.	2	1	$11\frac{1}{4}$	$75\frac{5}{12}$	„ „	8d.		
$99\frac{3}{16}$	„ „	7d.	2	17	$10\frac{5}{8}$	$87\frac{7}{16}$	„ „	8d.		
$102\frac{5}{16}$	„ „	8d.	3	8	$2\frac{1}{2}$	$114\frac{9}{16}$	„ „	9d.		
$114\frac{7}{12}$	„ „	8d.	3	16	$4\frac{5}{12}$	$145\frac{7}{12}$	„ „	9d.		
$204\frac{11}{12}$	„ „	9d.	7	13	$8\frac{1}{4}$	$305\frac{13}{16}$	„ „	10d.		
$324\frac{9}{16}$	„ „	9d.	12	3	$5\frac{1}{8}$	$605\frac{1}{8}$	„ „	10d.		
$189\frac{5}{8}$	„ „	10d.	7	18	$0\frac{1}{4}$	$745\frac{1}{8}$	„ „	11d.		
$376\frac{15}{16}$	„ „	11d.	17	5	$6\frac{5}{16}$	$846\frac{5}{8}$	„ „	11d.		
$111\frac{5}{12}$	„ „	10d.	4	12	$10\frac{9}{12}$	$1002\frac{7}{8}$	„ „	11d.		
$403\frac{5}{8}$	„ „	11d.	18	9	$11\frac{7}{8}$	$99\frac{3}{4}$	„ „	8d.		
									£183	9 $10\frac{3}{4}$ $\frac{4}{23}$

When fractions occur both in the quantity and price:—

RULE.—Find the value of the given quantity at the pence, neglecting the fraction in the price, by the last Rule, to which add the same part or parts of their amount at 1d., as the fraction in the price is of 1d.

EXAMPLES.

What will $36\frac{1}{3}$ yards amount to at $3\frac{1}{2}$d. per yard?

		s.	d.	
Thus (by last rule): $36\frac{1}{3}$ at 1d. is		3	$0\frac{1}{3}$	Add 1s. $6\frac{1}{4}$.,
			$3\frac{1}{2}$	$= \frac{1}{2}$ of 3s.
	Ans.	£0	10 $7\frac{5}{4}$	$0\frac{1}{3}$d., when
Or, $36\frac{1}{3}$ at 1d. is		£0	3 $0\frac{1}{3}$	multiplying
			$3\frac{1}{2}$	by 3.
$31\frac{1}{2}$ at $\frac{1}{2}$d. is		0	1 $6\frac{1}{4}$	
$31\frac{1}{2}$ at 3d. is		0	9 $1\frac{1}{2}$	
	Ans.	£0	10 $7\frac{5}{4}$	as before.

What will $182\frac{1}{8}$ lbs. cost at $5\frac{3}{4}$d. per lb.?

$182\frac{1}{8}$ at 1d. is	£0	15	$2\frac{1}{8}$	When multiplying by 5, add 11s
			$5\frac{3}{4}$	$4\frac{19}{32}$d., $= \frac{3}{4}$ of
	£4	7	$3\frac{7}{32}$	15s. $2\frac{1}{8}$d.

Or,

$182\frac{1}{8}$ at 1d. is	£0	15	$2\frac{1}{8}$
			$5\frac{3}{4}$
	4)2	5	$6\frac{3}{8}$
$182\frac{1}{8}$ at $\frac{3}{4}$d.,	0	11	$4\frac{19}{32}$
$182\frac{1}{8}$ at 5d.,	3	15	$10\frac{2}{8}$
	£4	17	$3\frac{7}{32}$ or, £4 17 $4\frac{2}{4}$ $\frac{23}{32}$

What will $168\frac{7}{16}$ yards cost at $7\frac{1}{8}$d. per yard?

Ans. £5 0 $0\frac{15}{128}$

What will $145\frac{3}{8}$ lbs. of butter amount to at $8\frac{1}{4}$d. per lb.?

Ans. £4 19 $11\frac{11}{32}$

What will $187\frac{7}{16}$ lbs. of mutton amount to at $5\frac{3}{8}$d. per lb.?

Ans. £4 0 $0\frac{1}{2}$ $\frac{15}{32}$

$27\frac{1}{4}$	lbs.	at	$3\frac{1}{4}$d.,	£0	7	$4\frac{1}{2}$ $\frac{1}{4}$
$32\frac{1}{2}$	,,	,,	$3\frac{1}{2}$d.,	0	9	$5\frac{3}{4}$
$45\frac{3}{4}$	,,	,,	$4\frac{1}{4}$d.,	0	16	$2\frac{1}{4}$
$48\frac{1}{8}$	,,	,,	$4\frac{3}{4}$d.,	0	19	$0\frac{1}{2}$ $\frac{3}{8}$
$59\frac{7}{12}$	,,	,,	$5\frac{1}{8}$d.,	1	5	$2\frac{3}{4}$ $\frac{5}{24}$
$66\frac{5}{12}$	,,	,,	$5\frac{7}{8}$d.,	1	8	$4\frac{1}{4}$ $\frac{13}{24}$
$75\frac{1}{8}$	,,	,,	$6\frac{1}{2}$d.,	2	0	$9\frac{1}{2}$ $\frac{2}{8}$
$109\frac{1}{8}$	,,	,,	$8\frac{1}{2}$d.,	3	15	$3\frac{1}{2}$ $\frac{1}{4}$
$112\frac{5}{12}$	,,	,,	$8\frac{1}{4}$d.,	3	17	$3\frac{1}{4}$ $\frac{3}{4}$
$96\frac{1}{4}$	,,	,,	$6\frac{1}{2}$d.,	2	12	$1\frac{1}{2}$ $\frac{1}{2}$
$108\frac{3}{4}$	,,	,,	$7\frac{1}{4}$d.,	3	5	$8\frac{1}{4}$ $\frac{3}{4}$
$118\frac{3}{8}$	,,	,,	$9\frac{1}{4}$d.,	4	11	$2\frac{3}{4}$ $\frac{7}{8}$
$95\frac{7}{12}$	,,	,,	$3\frac{5}{12}$d.,	1	7	$2\frac{1}{2}$ $\frac{11}{36}$
$109\frac{1}{8}$	,,	,,	$5\frac{3}{4}$d.,	2	12	$3\frac{1}{4}$ $\frac{7}{8}$
$162\frac{1}{16}$	,,	,,	$8\frac{1}{2}$d.,	5	12	$6\frac{1}{2}$ $\frac{1}{17}$
$170\frac{1}{12}$	,,	,,	$9\frac{5}{8}$d.,	6	16	5 $\frac{3}{32}$

To find the amount of any quantity or number of articles, such as yards, stones, pounds, &c., at any given number of shillings, &c., per yard, &c. :—

RULE.—Find the value of the articles at 1 shilling, and multiply the amount at 1 shilling by the number of shillings in the price. When the price consists of shillings and pence, add, to the amount of the given number of articles at the shillings in the price, such a a part or parts of their amount at 1 shilling as the pence or fraction in the price is of 1 shilling; and when a fraction occurs in the quantity, or in both quantity and price ;—*see the preceding rules for calculating at pence, &c.*

EXAMPLES.

What will 50 lbs. of tea amount to at 6s. per lb. ?

Thus, 50 lbs., at 1s. is £2 10 0

6

£15 0 0 Ans.

What will 127 yards of cloth cost at 9s. per yard?

127 yards at 1s. is £6 7 0

9

£57 3 0 Ans.

What will 127$\frac{1}{8}$ yards amount to at 12s. per yard?

127$\frac{1}{8}$ yards at 1s. is £6 7 1$\frac{1}{2}$

12

£76 5 6 Ans.

What will 87 pair of gloves amount to at 2s. 9d. per pair ?

NOTE.—9d. is $\frac{3}{4}$d. of 1 shilling.

87 pair at 1s. is £4 7 0

2$\frac{3}{4}$

Ans. £11 19 3

Add when multiplying by 2, £3 5s. 3s., which is $\frac{3}{4}$ of £4 7s.

What will 91 yards of cloth cost, at 15s. 7d. per yard?

91 yards, at 1s., is £4 11 0 — Add in £2 13s. 1d., $= \frac{7}{12}$ of £4 11s., when multiplying by 15.

$15\frac{7}{12}$

£70 18 1

What will 144 lbs. of tea cost, at 5s. 5d. per lb.?

144 lbs. at 1s., is £7 4 0 — Add £3 $= \frac{5}{12}$ of £7 4s. when multiplying by 5.

$5\frac{5}{12}$

Ans. £39 0 0

What will 228½ yards amount to, at 3s. 8d., per yard?

NOTE.—8d. is $\frac{2}{3}$ of 1 shilling.

228½ yards, at 1s., is £11 8 6 — When multiplying by 3; add £7 12s. 4d., $= \frac{2}{3}$ of £11, 8s. 6d.

$3\frac{2}{3}$

Ans. £41 17 10

Or, 228½ yards, at 1s., is £11 8 6

$3\frac{2}{3}$

3)22 17 0

Price of 228½, at 8d. ($\frac{2}{3}$s.) is £7 12 4

Do. of 228½, at 3s., is 34 5 6

Ans. £41 17 10 as before.

What will 168¼ lbs. of coffee amount to at 2s. 2d. per lb.?

NOTE.—2d. is $\frac{1}{6}$ of 1 shilling.

168¼ lbs. at 1s. is £8 8 3 — Add £1 8s. 0½d., $= \frac{1}{6}$ of £8 8s. 3d., when multiplying by 2.

$2\frac{1}{6}$

Ans. £18 4 6½

Or, 168¼ at 1s. is £8 8 3

$2\frac{1}{6}$

6)8 8 3

Amount, 168¼ at 2d. (1s.), £1 8 0½

Do., 168¼ at 2s., 16 16 6

Ans. £18 4 6½ as before.

CALCULATE THE VALUE OF, &c.

72	yards	at 3s.	per yard.	£10	16	0
91	„	at 5s.	„	25	15	0
87	„	at 4s. 6d.	„	19	11	6
91½	„	at 7s.	„	32	0	6
103¼	„	at 8s.	„	41	6	0
151⅛	„	at 9s.	„	68	0	1½
172¾	„	at 6s.	„	51	16	6
87	„	at 7s. 3d.	„	31	10	9
148	„	at 8s. 7d.	„	63	10	4
176	„	at 5s. 7d.	„	49	2	8
189	„	at 6s. 9d.	„	63	15	9
75	„	at 7s. 10d.*	„	29	7	6
42½	„	at 2s. 3d.	„	4	15	7½
78⅛	„	at 4s. 1½d.†	„	16	2	$3\frac{3}{16}$

CALCULATE THE VALUE OF, &c.

				£
112	lbs.	at 7d.	per lb.	
76½	„	at 10d.	„	
89	„	at 9½d.	„	
185	„	at 7¾d.	„	
96	„	at 5⅛d.	„	
84	„	at $8\frac{5}{12}$.	„	
24¼	yards	at 3s. 4d.	per yd.	
87¼	„	at 5s.	„	
96⅛	„	at 7s.	„	
44½	„	at 5s. 6d.	„	
98¾	„	at 7s. 9d.	„	
108⅝	„	at 5s. 1½d.	„	
				£158 15 $7\frac{3}{4}$ $\frac{3}{4}$

* 10*d. is* ⅚ *of a shilling.* † 1½*d. is* ⅛ *of a shilling.*

CALCULATE THE AMOUNT OF, &c.

$16\frac{1}{4}$	yards	at 3s.	per yard.	£2	8	9
$18\frac{1}{8}$	„	at 4s.	„	3	12	6
$22\frac{3}{8}$	„	at 7s.	„	2	16	$7\frac{1}{2}$
$29\frac{5}{12}$	„	at 8s.	„	11	15	4
$32\frac{3}{4}$	„	at 9s.	„	14	14	9
$40\frac{1}{2}$	„	at 11s.	„	22	5	6
$52\frac{1}{4}$	„	at 12s.	„	31	7	0
$19\frac{1}{8}$	„	at 4s. 3d.	„	4	1	$3\frac{1}{4}$ $\frac{1}{2}$
$24\frac{11}{12}$	„	at 5s. 4d.	„	6	8	$5\frac{1}{4}$ $\frac{1}{3}$
$28\frac{3}{4}$	„	at 6s. 8d.	„	9	11	8
$38\frac{5}{8}$	„	at 10s. 8d.	„	20	12	0
$40\frac{7}{12}$	„	at 12s. 9d.	„	25	17	$5\frac{1}{4}$
$42\frac{7}{8}$	„	at 17s. 8d.	„	37	17	$5\frac{1}{2}$
$56\frac{5}{16}$	„	at 8s. 4d.	„	23	9	$3\frac{1}{4}$
				£216	18	$0\frac{9}{4}$ $\frac{6}{6}$

What will 144 yards amount to at 3s. 1d. per yard?

144 yards at 1s. is £7 4 0 — Add 12s., $= \frac{1}{4}$ of £7 4s., when multiplying by 3.

$3\frac{1}{12}$

Ans. £22 4 0

Or, 144 at 1s. is £7 4 0

3

144 at 3s. is £21 12 0
144 at 1d. is 0 12 0

Ans. £22 4 0 as before.

What will 87 yards amount to at 5s. 9d per yard?

Ans. £25 0s. 3d.

What will $122\frac{1}{2}$ stones of beef amount to at 6s. 8d. per stone?

$122\frac{1}{2}$ at 1s. is £6 2 6 — Add £4 1s. 8d. $= \frac{2}{3}$ of £6 2s. 8d., when multiplying by 6.

$6\frac{2}{3}$

Ans. £40 16 8

Or, $122\frac{1}{2}$ at 1s. is £6 2 6
6

$122\frac{1}{2}$ at 6s. is £36 16 0
$122\frac{1}{2}$ at 1d. × 8 is 4 1 8

Ans. £40 16 8 as before.

What will $94\frac{1}{2}$ lbs. cost at 3s. 10d. per lb.?
Ans. £18 2s. 3d.

What will $109\frac{1}{4}$ lbs. amount to at 5s. 6d. per lb.
Ans. £30 0s. $10\frac{1}{2}$d.

Required the amount of $126\frac{1}{2}$ gallons of rum at 9s. 6d. per gallon?
Ans. £60 1s. 9d.

What will $97\frac{1}{4}$ yards of silk cost at 5s. 9d. per yard?
Ans. £27 19s. $2\frac{1}{4}$d

What will $125\frac{1}{8}$ stones of wool amount to at 12s. 6d. per stone?
Ans. £78 4s. $0\frac{3}{4}$d.

What will $85\frac{5}{12}$ oz. of silver plate amount to at 6s. 4d. per oz.?
Ans. £27 0s. $11\frac{1}{2}$d. $\frac{2}{3}$.

What will $91\frac{1}{2}$ cwt. amount to at 5s. 6d. per cwt.?
Ans. £25 3s. 3d.

What will $102\frac{3}{4}$ cwt. amount to at 8s. 7d. per cwt.?
Ans. £44 1s. $11\frac{1}{4}$d.

What will $49\frac{1}{4}$ yards amount to at 10s. 5d. per yard?
Ans. £25 13s. $0\frac{1}{4}$d.

What will $68\frac{3}{8}$ lbs. amount to at 5s. 2d. per lb.?
Ans. £17 13s, $3\frac{1}{4}$d.

What will $29\frac{11}{16}$ oz. amount to at 4s. 11d. per oz.?
Ans. £7 5s. $11\frac{1}{4}$d. $\frac{1}{4}$.

When the price is shillings, and divisible by 2 :—

RULE.—Multiply the quantity or number of articles by half the number of shillings; double the right-hand figure of the product for shillings, those on the left of it will be pounds, which, together with the shillings, will be the answer required. Or, when found more convenient, half the number of articles may be taken and the whole number of shillings.—The reason of this is, that multiplying by half the number of shillings, and taking the units' figure and doubling it for shillings, and the other figures as pounds, is the same as multiplying by the whole number of shillings and dividing by 20 shillings.

EXAMPLES.

What will 124 cwt. amount to at 14s. per cwt. ?

124
7 = ½ of 14

£86 16s. Ans.

What will 742 lbs amount to at 16s. per lb. ?

742
8 = ½ of 16

£593 12s. Ans.

What will 147 cwt. amount to at 18s. per cwt. ?

£132 6s. Ans.

What will 176 cwt. amount to at 9s. per cwt.

½ of 176 = 88
9

£79 4s. 0d. Ans.

Or,

176 at 1s is £8 16 0
9

Ans. £79 4 0 as before.

What will 148 stones of mutton cost at 9s. per stone ?

Ans. £66 12s. 0d.

What will 204 gallons of rum amount to at 13s. per gal ?

Ans. £132 12s. 0d.

Another concise and simple method of calculating the amount of any quantity or number of articles, when the price consists of pence, pence and farthings, or pence and any fraction of a penny, and the quantity a large number :—

RULE.—Find the number of dozens contained in the given number of articles; consider the pence in the price as shillings, if there be any fraction of a penny in the price; make it the same part or parts of a shilling, as it is of a penny, which, multiply by the number of dozens contained in the number of articles; and when the number of articles is not an even number of dozens, first find the amount of the even number of dozens, to which add the same part of the amount of 1 dozen, as the number over the even number of dozens is of 1 dozen.

EXAMPLES.

What will 144 yards of ribbon cost at 7½d. per yard?

1 yard at 7½d. is for 1 doz. £0 7 6 — Which multiply by 12, the number of doz. in 144.
12
Ans. £4 10 0

What will 42 lbs. amount to at 9½d. per lb.

£0 9 3 = price of 1 doz., which, multiply by
3½ 3, adding to the product 4s. 7½d.,
= ½ of 9s. 3d. for the price of the
Ans. £1 12 4½ half-dozen,

What will 48 lbs. amount to at 5d. per lb?
Ans. £1

What will 156 yards cost at 7½d. per yard?
Ans. £4 17s. 6d.

What will 49 oz. amount to at 6¼d. per oz.?
Ans. £1 5s. 6¼d.

What will 129 yards amount to at 9⅜d. per yard?
Ans. £4 18s. 1⅜d.

What will 744 stones of hay amount to at 6½d. per stone?

NOTE.—When there are many dozens in the quantity, they may be multiplied by the pence, &c., considered as shillings.

744 = 62 doz., which, multiply by 6½s., the price of
6½ 1 dozen of stones,

£20 3s. Ans.

CALCULATE THE VALUE OF, &c.

96	yards	at	4d.	per	yard	£1	12	0
48	„	„	5½d.	„	„	1	2	0
72	„	„	6¼d.	„	„	1	17	6
108	„	„	8¾d.	„	„	3	18	9
99	„	„	7d.	„	„	2	17	9
101	„	„	8d.	„	„	3	7	4
156	„	„	9½d.	„	„	6	3	6
180	„	„	10d.	„	„	7	10	0
110	„	„	9d.	„	„	4	2	6
84	„	„	5⅛d.	„	„	1	15	10½
						£34	7	2½

To find the value of any quantity or number of articles when the number is large :—

RULE.—Find the number of scores contained in the given quantity or number of articles; and for every shilling in the price of 1 article, reckon £1, and for every penny or fraction of a shilling, allow the same part or parts of £1, as the pence, farthings, or any other fraction in the price, is of one shilling, then multiply the price considered as pounds by the number of scores.

When the given number is not an even number of scores, calculate for the even number of scores, and for the fractional part as directed in the last rule.

EXAMPLES.

What will 120 yards amount to at 3s. 4d. per yard?
Thus, 20 (1 score) at 3s. 4d each is £3⅓ = £3 6 8
and 120 = 6 scores. 6

Ans. £20 0 0

What will 240 cwt. amount to at 9s. 3d. per cwt.?
Ans. £111

CALCULATE THE VALUE OF, &c.

60	stones	at	4s. 6d.	per	stone.	£13	10	0
120	„	„	6s. 9d.	„	„	40	10	0
140	„	„	7s. 11d.	„	„	55	8	4
220	yards	„	5s. 4½d.	per	yard.	59	2	6
180	„	„	6s. 7½d.	„	„	59	12	6
220	„	„	12s. 10½d.	„	„	141	12	6
200	„	„	13s. 7d.	„	„	135	16	8

To find the price of a hundred-weight when the price of 1 lb. is given :—

RULE.—Multiply the price of 1 lb., taken in pence, by $9\frac{1}{3}$, the product, considered as shillings, will be the value of 1 Cwt. Or, multiply the price of 1 lb., taken in farthings, by 7, the product, divided by 3, will be the value of 1 Cwt. in shillings. The same result will be obtained by multiplying by $2\frac{1}{4}$.

The reason for the first method is: that 1 Cwt., at 1d. per lb., is 9s. 4d., which, if multiplied by the number of pence, or by whatever fraction of a penny the price of the pound is, must give the price of 1 Cwt. at that rate per lb. The second method is the same as multiplying the price of 1 lb. by 112, the number of pounds in 1 Cwt.

EXAMPLES.

What will 1 Cwt. amount to at 5d. per lb.?

1 Cwt. at 1d. is £0 9 4 × 5

Ans. £2 6 8

Or, 5 × $9\frac{1}{3}$

Ans. $46\frac{2}{3}$s. = £2 6s. 8d.

By 2d method.

5d. = 20 farthings. × 7

3)140

Or, 20 × $2\frac{1}{3}$

$46\frac{2}{3}$s. = £2 6s. 8d

Ans. $46\frac{2}{3}$s. = £2 6s. 8d. as before.

What will 1 Cwt. amount to at 7d. per lb.?

Ans. £3 5s. 8d.

What will 1 Cwt. amount to at $9\frac{1}{4}$d. per lb.?

$9\frac{1}{4}$d. = 37 farthings. × 7

3)259

Ans. $86\frac{1}{3}$s. = £4 6s. 4d.

What will 1 Cwt. amount to at $4\frac{3}{4}$d. per lb.?

Ans. £2 4s. 4d.

What will 1 lb. cost at £4 12s. per cwt.?
Ans. $9\frac{3}{4}$d. $\frac{3}{7}$.

What will 1 lb. cost at £6 17s. 6d. per cwt.
£6 17 6 = $137\frac{1}{2}$s.
3
7)$412\frac{1}{2}$
Ans. $58\frac{3}{14}$ farthings = 1s. 2d$\frac{1}{2}$d. $\frac{3}{14}$ per lb. nearly 1s. 2$\frac{3}{4}$d. per lb.

What will be the price of 1 lb. at £9 12s. per cwt?
Ans. 1s. 8$\frac{1}{2}$d. $\frac{2}{7}$ per lb.

What will 1 lb. cost at 25s. per cwt?
Ans. 2$\frac{1}{2}$d. $\frac{5}{7}$ per lb.

What will 1 lb. cost at 18s. 8d. per cwt?
Ans. 2d per lb.

If 1 cwt. cost £7 12s., what is that per oz.?
£7 12s. = 152s
3
7)456
16)65$\frac{1}{7}$
$4\frac{8}{112}$ = $4\frac{1}{14}$ farthings = 1$\frac{1}{4}$d. per oz.

What will 1 oz. cost at £4 13s. 4d. per cwt.?
Ans. $\frac{1}{2}$d. $\frac{1}{2}$ or $\frac{5}{8}$d.

What should be paid for 1 oz. when 1 cwt. costs £12 15s. 8d. Ans. 1$\frac{1}{2}$d. $\frac{9}{112}$

If 1 cwt. cost £12 10s. 6d., what will 1 lb. cost.?
Ans. 2s. 2$\frac{3}{4}$d. $\frac{5}{14}$

If 1 cwt. cost £8 15s. 9d., what will 1 lb. cost?
Ans. 1s. 6$\frac{3}{4}$d. $\frac{9}{28}$.

If 1 cwt. cost £2 2s., what will 1 lb. cost?
Ans. 4$\frac{1}{2}$d.

To find the value of hundred-weights, qrs., and lbs., when the price of one pound is given :—

RULE.—Find the number of pounds in the given number of hundred-weights, qrs., lbs., then calculate for these by one or other of the preceding rules.

Find the number of pounds thus—for the hundred-weights, write as many hundreds, under which, write as many times 12 as there are of hundred-weights in the given quantity, and under this the number of pounds in the quarters and pounds of the given quantity, their sum will be the number of pounds in the hundred-weights, qrs., and lbs. of the given quantity.

EXAMPLES.

What will 4 cwts., 3 qrs., 12 lbs., amount to at 3½d. per lb. ?

400
48
96

4 cwt., 3 qrs., 12 lb., = 544 lbs. at 1d. ℔ lb. is £2 5 4
Add £1 2s. 8d., the ½ of £2 5s. 4d., when multiplying by 3. 3½
£7 18 8

What will 5 cwt., 1 qr., 20 lbs., amount to at 5½d. per lb. ?
Ans. £13 16s. 10d.

What will 8 cwt., 2 qrs., 8 lbs., amount to at 7½d. per lb. ?

800
96
64

960 lbs. = 80 doz.

80
7½s. = price of 1 doz. at 3½ each lb.

600s. = £30. Ans.

Or, 80 doz. at 1s. is £4
7½

Ans. £30 as before.

What will 12 cwt., 3 qrs., 16 lbs., amount to at 1s. 3d. per lb. ? Ans. £81 15s.

What will 10 cwt., 3 qrs., 20 lbs., amount to at 10½d. per lb. ? Ans. £53 11s.

What will 18 cwt. amount to at 8¾d. per lb. ?
Ans. £73 10s.

CALCULATE THE VALUE OF, &c.

2	qrs.,	7	lb.,	of sugar at 6d.	per lb.	£1	11	6
3	„	12	„	of soap at 5½d.	„	2	4	0
1	„	21	„	of candle at 7d.	„	1	8	7
2	„	18	„	of tea at 5s. 6d.	„	20	7	0
1	cwt.,	2	qrs.,	of coffee at 2s. 3d.	„	18	18	0
5	cwts.,	3	qrs.,	14 lbs., of iron at 2½d.	„	6	17	1
2	„	1	„	12 „ of soda at 2¼d.	„	2	9	6
9	„	3	„	of loaf-sugar at 7¼d.	„	32	14	11
12	„	1	„	18 lbs. of starch at 6½d.	„	37	12	11

———, 1st January, 1852.

Mr. J—— T——

Bought of R—— N——.

1st Jan., 1851.

						℔	lb	£
To	1	cwt.,	2	qrs.,	12 lbs., tea at 5s. 6d.			
„	2	„	1	„	14 „ sugar at 6½d.		„	
„	3	„	2	„	soap at 5½d.		„	
„	2	„	16	lbs.	soda at 2¼d.		„	
„	5	„	3	qrs.,	starch at 6¾d.		„	
„	0	„	3	„	18 lbs., snuff at 3s. 10d.		„	
„	1	„	2	„	12 „ tobacco at 3s. 9d.		„	
„	0	„	2	„	23 „ rasins at 6¼d.		„	

£141 8 1¾

To find the amount of 1 pound Troy-weight, when the price of one penny-weight is given :—

Rule.—The price of 1 penny-weight in pence, will, taken as pounds sterling, be the price of one pound troy.

The reason of this is, that it is the same as multiplying the price of 1 penny-weight in pence by 240, the number of penny-weights in 1 lb., and then reducing their product to pounds.

EXAMPLES.

What will 1 lb. amount to at 7½d. per dwt.?
1 lb. at 7½d. per dwt. is £7 10s.
Or, 240 × 7½d. = 1800d. = 150s. = £7 10s. as before.

What will 2½ lbs. amount to at 3¼d. per dwt.?

1 lb. at 3¼d. per dwt. is	£3	5	0	Add £1 17s. 6d.
			2½	= ½ of £3 5s.,
Ans.	£8	2	6	when multiplying by 2.

What will 4 lbs. cost at 1⅛s. per dwt.
Ans. £54

To find the price of 1 lb. troy when the price of 1 grain is given:—

RULE.—Multiply the price of 1 grain in pence, by 24, the product, considered as pounds, will be the price of 1 lb. troy.

EXAMPLES.

What will 1 lb. amount to at ¼d. per grain?
¼ × 24 = £6 Ans.

What will 1 lb. amount to at 1⅛d. per grain?
Ans. £27

CALCULATE THE VALUE OF, &c.

1 lb. troy at 2¼d.	per dwt.	£2	5	0
1 lb. „ „ 3⅛d.	„ „	3	2	6
1 lb. „ „ 1⅝d.	„ „	1	12	6
1 lb. „ „ ¾d.	„ „	0	15	0
1 lb. „ „ 1 7/12 d.	„ „	1	11	8
1 lb. „ „ 2⅙d.	„ „	2	4	0
2 lb. „ „ 1 11/12 d.	„ „	3	16	8
4 lb. „ „ 2 3/10 d.	„ „	9	4	0
2½ lb. „ „ 1 1/16 d.	„ „	2	13	1½
1 lb. „ „ ½d.	per grain.	12	0	0
1 lb. „ „ 1⅛d.	„	27	0	0

To find the price of 1 lb. Apothecaries' weight, when the price of a grain, a scruple, or that of a dram is given :—

1. To find the price of 1 lb. when the price of 1 grain is given.

RULE.—Multiply the price of 1 grain in pence, considered as pounds sterling by 24.

EXAMPLES.

What will 1 lb. amount to at 3½d. per grain?

	24	Or, £3	10 = £3½.
3½d. considered as pounds =	£3½		24
	£84 Ans.		£84 0 as before.

What will 1 lb. amount to at 1⅛d. per grain?

	24	Or, £1	2 6 = £1⅛.
	1⅛		24
	£27 Ans.		£27 0 0 as before.

---

2. To find the price of 1 lb. when the price of a scruple is given :—

RULE.—Multiply the price of a scruple, in pence, considered as pounds sterling, by 1⅓; or multiply it by 6 and divide by 5.

EXAMPLES.

What will 1 lb. amount to at 2¾d. per scruple?

	£	s.	d.	
2¾d., considered as pounds, =	2	15	0	Add 11s. = ⅓ of £2 15s. when multiplying by 1.
			1⅓	
Ans.	£3	6	0	

	£	s.	d.
Or,	2	15	0
			6
	5)16	10	0
Ans.	£3	6	0 as before.

What will 1 lb. amount to at 3⅗d. per scruple?

	£	s.	d.	
3⅗d. considered as pounds =	3	7	6	Add 13s. 6d., = ⅕ of £3 7s. 6d., when multiplying by 1.
			1⅕	
Ans.	£4	1	0	

Or, 3⅗d. considered as pounds = £3⅗ Add £3$\frac{7}{40}$ = ⅕ of £3⅗, when multiplying by 1⅕.

1⅕

Ans. £4$\frac{2}{40}$

£4$\frac{2}{40}$ = £4 1s., as before.

---

3. To find the price of 1 lb. when the price of 1 dram is given:—

RULE.—Multiply the price of a dram, in pence, by 8, and the product will be the price of 1 lb. in shillings.

The reason of the three preceding Rules is, that the method adopted in the first of them is the same as multiplying the price of 1 grain by 5760, the number of grains in 1 lb., and dividing the product by 4, 12, and 20, according as the price of the grain is farthings, pence, or shillings; that adopted in the second is the same as multiplying the price of 1 scruple by 288, the number of scruples in 1 lb., and reducing the product to a higher denomination by dividing by 4, 12, and 20, according as the price of the scruple is farthings, pence, or shillings; and that of the third is the same as multiplying the price of 1 dram by 96, the number of drams in 1 lb., and dividing as before directed.

EXAMPLES.

What will 1 lb. amount to at 7½d. per dram?

D.
7½
8

60s. = £3. Ans.

What will 1 lb. amount to at 3s. $1\frac{7}{12}$d. per dram?

s.	d.		d.
3	$1\frac{7}{12}$	=	$37\frac{7}{12}$
			8

$300\frac{8}{12}$s. = £15 0s. 8d. Ans.

CALCULATE THE VALUE OF, &c.

1 lb.	Apothecaries'	Weight at	$1\frac{1}{2}$d.	per grain.	£30	0 0
1 „	„		$1\frac{5}{8}$d.	„	39	0 0
1 „	„		$1\frac{3}{4}$d.	„	42	0 0
1 „	„		$1\frac{1}{2}$d.	„	36	0 0
1 „	„		$2\frac{1}{4}$d.	per scruple.	2	14 0
1 „	„		$3\frac{1}{8}$d.	„	3	15 0
1 „	„		$3\frac{5}{12}$d.	„	4	2 0
2 „	„		$3\frac{11}{12}$d.	„	9	8 0
$3\frac{1}{2}$ „	„		$3\frac{1}{4}$d.	„	13	13 0
1 „	„		$5\frac{1}{2}$d.	per dram.	2	4 0
1 „	„	1s. 8d.		„	8	0 0
1 „	„	2s.	$1\frac{5}{12}$d.	„	10	3 4
3 „	„	2s. 6d.		„	36	0 0
$4\frac{1}{2}$ „	„	1s.	$6\frac{3}{4}$d.	„	33	15 0

To find the value of 1 acre when that of 1 pole is given:—

RULE.—From the value of 1 pole, in pence, deduct $\frac{1}{3}$, and the remainder will be the value of 1 acre, in pounds sterling, or some fraction of £1; or, multiply the value of 1 pole in pence by 2, the product, divided by 3, will be the value of 1 acre in pounds sterling.

The reason of this is, that it is the same as multiplying the rent of 1 pole by 160, the number of poles in 1 acre, and then reducing the product to pounds sterling.

EXAMPLES.

What will 1 acre amount to at 5d. per pole?

	5	Or,	5
deduct $\frac{1}{3}$ of 5 =	$1\frac{2}{3}$		2
Ans.	£$3\frac{1}{3}$ = £3 6s. 8d.		3)10

Ans. £$3\frac{1}{3}$ as before.

What will 1 acre amount to at 6d. per pole?
Ans. £4.

What will 1 acre amount to at 8½d. per pole?
Ans. £5 10s.

What will 1 acre amount to at 1s. 3d. per pole?
Ans. £10.

What will 1 acre amount to at 1s. 9¾d. per pole?
Ans. £14 10s.

To find the value of 1 pole, when that of 1 acre is given:—

RULE.—Consider the value of 1 acre, in pounds, as pence, which multiply by 3, and divide the product by 2, the quotient will be the value of 1 pole in pence.

NOTE.—When the value of 1 acre does not amount to £1, consider it the same part or parts of 1d, as it is of £1.

If the rent of 1 acre be £4, what is that per pole?

£4, considered as pence, is D. 4 × 3 = 12

2)12

Ans. 6d. per pole.

If the rent of 1 acre be 15s., what is that per pole?

15s. = £¾, which, considered as pence, is D. 0¾ × 3 = 2¼

2)2 ¼

Ans. 1 ¼ ½ per pole.

If the rent of 1 acre be £7 12s.; what is that per pole?
Ans. 11⅗d. = 11½d. ⅗

If the rent of 1 acre be £2 5s., what is that per pole?
Ans. 3⅜d.

To find the rent of 1 rood, when that of 1 pole is given :—

RULE.—Divide the rent of 1 pole in pence, by 6; the quotient will be the rent of 1 rood in pounds sterling, or some part or parts of £1. Or, from the rent of 1 pole in pence, deduct $\frac{5}{6}$, and the remainder will be the rent of 1 rood in pounds, part or parts of £1.

EXAMPLES.

If the rent of 1 pole be 9d., what is that per rood ?

D.
6)9

Ans. £1$\frac{3}{6}$ = £1 10s.

Or,

D.
9

deduct $\frac{5}{6}$ of 9d. = 7$\frac{3}{6}$

Ans. as before. £1$\frac{3}{6}$ = £1 10s.

If the rent of 1 pole be 7½d., what is that per rood ?

D.
6)7½

Ans. £1$\frac{1}{2}$ = £1 5s.

If the rent of 1 pole be 7⅓d., what is that per rood ?

D.
7⅓

Deduct $\frac{5}{6}$ of 7$\frac{1}{3}$ = 6

Ans. £1$\frac{1}{3}$ = £1 4s.

What is the value of 1 rood, of which 1 pole costs 1s. 3d ?

D.
6)15 = 1s. 3d.

Ans. £2$\frac{3}{6}$ = £2 10s.

To find the price of a pole, when that of a rood is given :—

RULE.—Multiply the rent of 1 rood in pounds sterling, by 6, the product considered as pence will be the rent of 1 pole. —when the rent of 1 rood does not amount to £1. make it a fraction of £1, and multiply the fraction which it is of £1 by 6.

EXAMPLES.

If the rent of 1 rood of land be 15s., what is that per pole?

	£
15s.	$\frac{3}{4}$
	6
	$\frac{18}{4}$d. = 4$\frac{1}{2}$d. Ans.

If the rent of 1 rood be £1 5s., what is that per pole?

	£
£1 5s. =	1$\frac{1}{4}$
	6
Ans.	7$\frac{1}{2}$d.

What is the rent of 1 pole, at £1 7s. 6d. per rood?

	£
£1 7s. 6d. =	1$\frac{3}{8}$
	6
Ans.	$\frac{48}{8}$d. = 8$\frac{1}{4}$d.

The following will be found a concise and simple method of performing exercises in Proportion:—

EXAMPLES.

If 3 yards cost £1 12s., what will 27 yards cost?

NOTE.—In the above example it is evident that the price of 27 yards must be 9 times more than that of 3, since 3 is contained in 27 just 9 times; hence the price of 27 yards may be found by multiplying £1 12s. by 9. Or, as £1 12s. is the price of 3 yards, it may be divided by 3, which will give the price of 1 yard, and then multiply the price of 1 yard by 27. Thus,

£	s.			£	s.	d.	
1	12		Or,	3)1	12	0	
	9			0	10	8	
£14	8	Ans.				9	× 3 = 27
				4	16	0	
						3	
			Ans.	£14	8	0	as before.

From the above example the following general rule, for this abreviated method, may be deduced:—

RULE.—Divide any of the three terms by either of the other two, and multiply or divide the other by that quotient, as the nature of the question may require.

What will 3 lb. of tea cost, of which 24 lbs. cost £6?

Here 3 lb. is $\frac{1}{8}$ of 24, or 24 contains 3—8 times; and therefore £6 divided by 8, is = 15s. = price of 3 lbs. Or, divide £6 by 24 = 5s. = price of 1 lb., which multiply by 3 = 15s. = price of 3 lbs., as before.

If $7\frac{1}{2}$ lbs. cost £4 10s., what will 75 lbs cost?

	lbs.		lbs.			£ s.	
	$7\frac{1}{2}$	:	75	:	:	4 10	
Or,	1	:	10	:	:	4 10	
						10	
						£45 0	Ans.

If 14 lbs. cost 8s. 2d., what will $\frac{1}{2}$ lb. cost?

	lb.		lb.			s. d.		s. d.	
	14	:	$\frac{1}{2}$	:	:	8 2			
Or,	28	:	1	:	:	8 2	:	8 2	
								28	= 3½d. Ans.

If 12 men do a piece of work in 48 days, in what time should 36 men do it?

	Men.		Men.			Days.		
	36	:	12	:	:	48		
Or,	3	:	1	:	:	48	:	16 days. Ans.

INTEREST.

Interest is an allowance given by the borrower to the lender for the money lent; rate per cent is the sum agreed upon; principal is the money lent; amount is the sum of the principal and interest.

To calculate interest for months at £5 per cent :—

RULE.—Divide the principal in pounds, by the same part or parts of a unit as the months are of 1 year, the quotient will be the interest in shillings.

Or,

As the interest of £1 per 1 month, at £5 per cent, is 1d. ; the principal in pounds, considered as pence, will be the interest of the sum for 1 month, in pence, which multiplied by the number of months, will be the interest for the time required.

EXAMPLES.

What is the interest of £60, for 4 months, at £5 per cent ?

By the first rule—

£60 ÷ 3 = 20s. = £1, the interest of £60 for 4 months at 5 per cent.

By the second rule—

£60 taken as pence = 5s. = the interest of £60 for 1 mo.
4

Ans. £1 0s. Interest of £60 for 4 months, at £5 per cent.

NOTE.—When the months are not an aliquot part of 1 year, the 2d Rule will be shortest, and most easy for mental calculation.

Required the interest of £45 for 6 months, at £5 per cent ?

£45 for 1 month, at £5 per cent, is £0 3 9
6

Ans. £1 2 6

In order to prove that the interest of £1 for 1 month at £5 per. cent., is 1d., the following example is wrought at full length :—

Ex.—Required the interest of £1 for 1 month at £5 per cent. per annum?

	£	£	£
	100	: 1	: : 5
Months.	12	: 1	
	1200	1	
		5	

1200) 5 (£ 0 s. 0 d. 1 Ans.—Interest for 1 mon.
20

1200) 100 (0
12

1200) 1200 (1
1200

0

Other methods might be employed to prove that the interest of £1 for 1 month, at £5 per cent., is 1d.; and, at any lower rate, a proportional part of 1d.:—Thus, the interest of £100 for 1 month, at £5 per cent., must be the 12th part of £5, which is 8s. 4d., or 100 pence; and, therefore, as the interest of £100 for 1 month, at £5 per cent, is 100 pence, so the interest of £1, at the same rate, and for the same time, must be 1 penny.

What is the interest of £68 for 6 months at £5 per cent.? —(6 months = ½ year.)

£					
2)68	Or, £68 for 1 month =	£0	5	8
				6
Ans. 34s. = £1 14s.—Int. for 6 mo.	Ans.	£1	14	0

What is the interest of £120, for 2 months at £5 per cent.? —(2 months = ⅙ year.)

£				
2)120	Or, £120 for 1 month is	£0	10	0
				2
20s. = £1.	Ans.	£1	0	0

What is the interest of £40, for 9 months at £5 per cent. ? —(9 months = $\frac{3}{4}$ year.)

£
40
$\frac{3}{4}$

Ans. 30s. = £1 10s.

Or, £40 for 1 month is £0 3 4
9

Ans. £1 10 0

Required the interest of £140, 11s. 8d., for 6 months at £5 per cent. ?

NOTE.—When shillings, or shillings and pence, occur in the principal, the interest of these for one month is the same part or parts of 1d. as the shillings, or shillings and pence are of £1.

11s. 8d. is $\frac{7}{12}$ of £1.

£
2)140$\frac{7}{12}$

Ans. 70$\frac{7}{24}$s. = £3, 10s. 3$\frac{1}{2}$d.

Or, £140 11s. 8d. for 1 mo. is £0 11 8$\frac{7}{12}$
6

£3 10 3$\frac{1}{2}$

What will £320, 10s. amount to in 7 months at £5 per cent. ?

£
320$\frac{1}{2}$
$\frac{7}{12}$

12)2243$\frac{1}{2}$

Interest for 7 months = 186$\frac{23}{24}$s. = £9 6 11$\frac{1}{2}$
Principal 320 10 0

Ans. £329 16 11$\frac{1}{2}$

Or, £320$\frac{1}{2}$ for 1 month is £1 6 8$\frac{1}{2}$
7

Interest for 7 months £9 6 11$\frac{1}{2}$
Principal 320 10 0

Ans. £329 16 11$\frac{1}{2}$

Calculate the interest on the following sums at £5 per cent.?

£50	for	2	months.	£0	8	4	
80	„	3	„	1	0	0	
75	„	4	„	1	5	0	
120	„	6	„	3	0	0	
180	„	9	„	6	15	0	
20 10s.	„	11	„	0	18	$9\frac{1}{2}$	
140 15s.	„	7	„	4	2	$1\frac{1}{4}$	
130 17s. 6d.,	for	4	months,	2	3	$7\frac{1}{2}$	
89 12s. 6d.,	„	8	„	2	19	9	
125 5s.,	„	$3\frac{1}{2}$	„	1	16	$5\frac{1}{4}$	$\frac{1}{2}$
360 11s. 8d.,	„	5	„	7	10	$2\frac{3}{4}$	$\frac{2}{3}$
1000 7s. 6d.,	„	6	„	25	0	$2\frac{1}{4}$	

To calculate the interest for years at £5 per cent.:—

As it has already been demonstrated that the interest of £1 for 1 month at £5 per cent. per annum is 1d., so the interest of £1 for 1 year at the same rate must be 1s.; and from this the following general rule may be deduced.

RULE.—Multiply the principal in pounds, by the number of years, the product will be the interest in shillings.

EXAMPLES.

Required the interest of £120 for 3 years at £5 per cent. per annum.

£
120
3

Ans. 360s. = £18

What is the interest of £250 10s. for 4 years at £5 per cent.

£
$250\frac{1}{2}$
4

Ans. 1002s. = £50 2s.

What is the interest of £120 10s. 6d. for $4\frac{1}{2}$ years at £5, per cent?—(12s. 6d $= \frac{5}{8}$ of £1).

£

$120\frac{5}{8}$ Add £60 $\frac{5}{16}$ $= \frac{1}{2}$ of £$120\frac{5}{8}$

$4\frac{1}{2}$ when multiplying by 4.

Ans. $542\frac{13}{16}$s. = £27 2s. $9\frac{3}{4}$d.

Or,

£	s.	d.	
120	12	6	Add £60 6s. 3d. = $\frac{1}{2}$ of £120
		$4\frac{1}{2}$	12s. 6d., when multiplying by 4.
£542	16	3	

£542 16s. 3d, considered as shillings = $542\frac{13}{16}$s. = £27 2s. $9\frac{3}{4}$d. Ans., as before.

What is the interest of £350 15s., for two years and 3 months, at £5 per cent.?—(3 months $= \frac{1}{4}$ year).

£

£$350\frac{3}{4}$ Add $87\frac{11}{16}$ $= \frac{1}{4}$ of $350\frac{3}{4}$,

$2\frac{1}{4}$ when multiplying by 2.

Ans. $789\frac{3}{16}$s. = £39 9s. $2\frac{1}{4}$d.

What is the interest of £147 17s. 6d., for 7 years and 7 months, at £5 per cent.?—(7 months, $= \frac{7}{12}$ of a year, and 17s. 6d. $= \frac{7}{8}$ of £1.)

£

$147\frac{7}{8}$ Add £$86\frac{35}{96}$ $= \frac{7}{12}$ of £$147\frac{7}{8}$

$7\frac{7}{12}$ when multiplying by 7.

Ans. $1121\frac{371}{576}$s. = £56 1s. $4\frac{1}{2}$d.

Required the interest of £146 for 3 years at £5 per cent?

Ans. £21 8s.

What is the interest of £240 10s. for 5 years at £5 per cent.?

Ans. £60 2s. 6d.

Required the interest of £120 15s., for 6 years and 4 months, at £5 per cent?—(15s. $= \frac{3}{4}$ of £1, and 4 months, $= \frac{1}{3}$ of 1 year).

Ans. £38 4s. 9d.

Calculate the interest on the following sums at £5 per cent :—

£140 for 3 years..... £
189 for 5 years.....
240 10s. for 4 years.....
180 15s. for 5 years.....
640 17s. 6d. for 2 years 6 months.....
186 12s. 6d. for 2 years 2 months.....

To find the interest for months at £6 per cent. :—

RULE.—Divide the principal in pounds, by 5, the quotient considered as sixpences, will be the interest for 1 month, at £6 per cent, which multiply by the number of months, and the product will be the interest for the required time.

The reason of this is, that as 1d. is the interest of £1 for 1 month, at £5 per cent. per annum; so the interest of £1 for 1 month, at £6 per cent. per annum must be $1\frac{1}{5}$d.; and, therefore, the interest of £5, at the same rate and for the same time, must be 6d., hence dividing the principal by 5 must give the interest of that sum for 1 month in sixpences. The reason for the following Rules for the finding of interest is similar to those given.

EXAMPLES.

Required the interest of £320 12s. 6d. for 4 months at £6 per cent?

12s. 6d. $= \frac{5}{8}$ of £1.

£
5)320$\frac{5}{8}$

$64\frac{1}{8}$* sixpences = interest for 1 month at £6 per cent., and $64\frac{1}{8}$* sixpences = £1 12 $0\frac{3}{4}$
4

Ans. £6 8 3

Required the interest of £120 for 3 months at £6 per cent?

£
5)120

24 sixpences = 12s. and 12s. × 3 = £1 16s. Ans.

* $\frac{1}{8}$ of a sixpence is $\frac{3}{4}$d.

Required the interest of £145, 17s. 6d. for 6 months at £6 per cent. ?—(17s. 6d. = $\frac{7}{8}$ of £1.)

£
5)145$\frac{7}{8}$

29$\frac{7}{40}$s. = £0 14 7$\frac{1}{20}$ = Interest for 1 month.
6

Ans. £4 7 6$\frac{3}{10}$ = £4 7 6$\frac{1}{4}$ $\frac{1}{5}$

To find the interest of any sum of money for 1 year, at £6 per cent. :—

Rule.—Multiply the principal, in pounds, by 6, and divide by 5, the quotient will be the interest for 1 year in shillings. Or, add to the principal $\frac{1}{5}$ of itself, both taken in pounds, part or parts of a pound, their sum will be the interest of the sum in shillings, for 1 year at £6 per cent.

The reason of this is, that the operation is the same as multiplying the principal by 6, the rate per cent., and dividing by 100; which is the usual method.

EXAMPLES.

Required the interest of £40 for 1 year at £6 per cent.

	£		£
$\frac{1}{5}$ of £40 =	40 8	Or,,	40 6
Ans.	48s. = £2 8s.		5)240
		Ans.	48s. = £2 8s., as before.

Or, by the rule for finding the interest for months, thus: £40 ÷ 5 = 8 sixpences = 4s. = interest for 1 month, and 4s. × 12 = £2 8s. = interest for 1 year, as before.

Required the interest of £180, 12s. 6d., for 1 year at £6 per cent. ?

Ans. £10 16s. 9d.

Calculate the interest on the following sums, at £6 per cent. per annum.

£145	for 1 year at £6 per cent.,	£8	14	0		
180	„ „	10	16	0		
240 12s. 6d.	„ „	14	8	9		
350 17s. 6d.	„ „	21	1	0½	2/5	
760 10s.	„ „	45	12	7⅕		
40 12s. 6d.	„ „	2	8	9		

To find the interest of any sum of money for months at £2½ per cent. :—

RULE.—Half the principal in pounds, will be the interest, in pence, for 1 month, which multiplied by the given number of months will be the interest for the required time in pence. Or, find the interest at £5 per cent., and take one half of it, the interest for 1 year is half the principal in pounds, part or parts of £1, considered as shillings.

The reason of this is, that the operation is the same as that of multiplying the principal by 2½, dividing by 100, and then taking such a part or parts of the interest for 1 year, as the months are of 1 year.

EXAMPLES.

Required the interest of £40, for 3 months, at £2½ per cent. ?

£
2)40
—
20d. = S. 1 D. 8 = Interest for 1 month at £2½ per cent.
3
—
Ans, 5 0 Interest for 3 months.

Or, £40 for 1 month at £5 per cent. is £0 3 4
3
—
£40 for 3 months at £5 per cent. is £0 10 0
and one-half of 10s. is 5s. Ans. as before.

Required the interest of £120, 10s. for 6 months at £2½ per cent. ?

£	s.		D.					
2)120	10							
60	5	=	60½	=	£0	5	0¼	Interest for 1 mo.
							6	
				Ans.	£1	10	1½	

Required the interest of £430 15s. for 1 year at £2½ per cent.

£	s.	D.	
2)430	15	0	
Ans. £215	7	6*	Or, 215⅗s. = £10, 15s. 4½d.

Calculate the interest on the following sums at £2½ per cent. :—

	£
£120 for 3 months.....	
320 for 4 months.....	
190, 10s. for 7 months.....	
500, 13s. 4d. for 10 months.....	
84, 10s. for 1 year.....	
180 for 1 year, 4 months.....	
25 for 1 year, 6 months.....	

To find the interest of any sum of money for months, at 3 per cent :—

RULE.—Divide the principal in pounds by 20, the quotient will be the interest in shillings for one month ; or, consider the principal in pounds as shillings ; these divided by 20, will be the interest of the sum for 1 month, which multiply by the given number of months ; or, calculate the interest at £6 per cent., and take one-half of it.

To find the interest for 1 year at £3 per cent. :—

RULE.—Multiply the principal in pounds by 3, and divide the product by 5, the quotient will be the interest of the sum in shillings.

---

* 7s. 6d. is ½ of £1, and in the answer must be considered as ½ of 1s.

EXAMPLES.

What is the interest of £60 for 3 months at £3 per cent?

£
20)60

3s. Interest for 1 month.
3

Ans. 9s. Interest for 3 months.

Required the interest of £180 17s. 6d. for 8 months. at £3 per cent?—(17s. 6d. = $\frac{7}{8}$ of £1).

£
20)180$\frac{7}{8}$

$9\frac{7}{160}$s. Interest for 1 month.
8

Ans. $72\frac{7}{20}$s. = £3 12s. $4\frac{1}{5}$d. Interest for 8 mo.

Required the interest of £180 15s. 6d. for 1 year at £3 per cent?—(15s. 6d. = $\frac{31}{40}$ of £1).

£
$180\frac{31}{40}$
3

5)$542\frac{13}{40}$

Ans. $108\frac{93}{200}$s. = £5 8s. $5\frac{1}{2}$d. $\frac{8}{25}$.

What is the interest of £41 12s. 6d. for 6 months at £3 per cent.?

£
20)$41\frac{5}{8}$

$2\frac{14}{160}$s. Interest for 1 month.
6

Ans. $12\frac{7}{160}$s. = 12s. $5\frac{1}{4}$d. $\frac{2}{5}$. Interest for 6 mo.

What is the interest of £80 for 9 months at £3 per cent.?
Ans. £1 16s.

What is the interest of £320 10s. for 10 months at £3 per cent. ?

Ans. £8, 0s. 3d.

Calculate the interest on the following sums at £3 per cent :—

£40	for 4 months.	£0	8 0
78	for 3 „	0	11 $8\frac{1}{4}\frac{3}{5}$
130	for 7 „	2	5 6
184	for 8 „	3	13 $7\frac{1}{5}$
290	for 9 „	6	10 6
160 10s.	for 8 „	3	4 $2\frac{1}{4}\frac{}{5}$
80 17s. 6d.	for 4 „	0	16 $2\frac{1}{10}$
89 6s. 8d.	for 6 „	1	6 $9\frac{1}{2}\frac{3}{20}$
137 5s.	for 3 „	1	0 $7\frac{1}{20}$

To find the interest of any sum of money for months, at £3½ per cent. :—

Rule.—Multiply the principal in pounds, by 7, and divide the product by 10, the quotient will be the interest in pence for 1 month, which multiply by the number of months.

To find the interest for 1 year at £3½ per cent, multiply the principal in pounds by 7, and divide by 10, the quotient will be the interest in shillings.

EXAMPLES.

Required the interest of £60 for 3 months at £3½ per cent.

£
60
7

10)420

42d. = s. 3 d. 6 = Interest for 1 month.
3

Ans. 10 6 = Interest for 3 months.

Required the interest of £95 17s. 6d. for five months, at £3½ per cent. ?—(17s. 6d. = $\frac{7}{8}$ of £1.)

£
95$\frac{7}{8}$
7

10)671$\frac{1}{8}$

67$\frac{9}{80}$d. = £0 5s. 7$\frac{9}{80}$d. = Interest for 1 month.
5

Ans. £1 7s. 11½d. ¼ = Interest for 5 months.

Required the interest of £146 for 9 months, at £3½ per cent ?

Ans. £3 16s. 7¾d. $\frac{1}{5}$.

Required the interest of £95 12s. 6d. for 4 months, at £3½ per cent. ?

Ans. £1 2s. 3¾d.

Calculate the interest on the following sums at £3½ per cent. :—

£40	for 3 months.	£0 7 0	
80	for 4 „	0 18 8	
120	for 5 „	1 15 0	
160 10s.	for 7 „	3 5 6¼	$\frac{4}{5}$
122 12s. 6d.	for 8 „	2 17 2½	$\frac{4}{5}$
180 17s. 6d.	for 9 „	4 14 11½	$\frac{1}{20}$
170 1s. 8d.	for 6 „	2 19 6¼	$\frac{2}{5}$
184 15s.	for 11 „	5 18 6½	$\frac{3}{10}$
50 6s. 8d.	for 5 „	0 14 8¾	$\frac{2}{3}$
75 1s. 3d.	for 7 „	1 10 7¾	$\frac{0}{20}$

To calculate the interest of any sum of money for months, at £4 per cent., and at £2 per cent. :—

Rule.—Divide ¼ of the principal in pounds by 5, the quotient will be the interest for 1 month in shillings at £4 per cent, and at £2 per cent., divide ⅛ of the principal in pounds by 10, the quotient will be the interest for 1 month in shillings, at £2 per cent., which multiply by the number of months.

EXAMPLES.

Required the interest of £75 for 4 months at £4 per cent.?

£
3)75

5)25 = $\frac{1}{3}$ of 75.

5s. = Interest of £75 for 1 month at £4 per cent.
4

Ans. £1 0s. = Interest for 4 months.

What is the interest of £181, 2s. 6d. for 5 months at £4 per cent?

£
3)181$\frac{1}{8}$

5)60$\frac{3}{8}$ = $\frac{1}{3}$ of 181$\frac{1}{8}$.

12$\frac{3}{40}$s. = Interest for 1 month.
5

Ans. £3 0$\frac{15}{40}$s. = £3, 0s. 4$\frac{1}{2}$d. = Interest for 5 months.

What is the interest of £126, 12s., for 9 months at £4 per cent.?

£
3)126$\frac{3}{5}$

5)42$\frac{1}{5}$ = $\frac{1}{3}$ of 126$\frac{3}{5}$

8$\frac{1}{25}$s. = Interest for 1 month.
9

Ans. 75$\frac{9}{25}$s. = £3, 15s. 11$\frac{1}{2}$d. $\frac{3}{5}$ = Interest for 9 mo.

What is the interest of £165, for 4 months, at £2 per cent.?

£
3)165

10)55 = $\frac{1}{3}$ of 165.

5$\frac{1}{2}$s. = Interest for 1 month.
4

Ans. £1 2s. 0d. = Interest of £165 for 4 months at £2 p. c.

CALCULATE THE INTEREST ON THE FOLLOWING SUMS:—

£80	for 3 months,	at £4 per cent.	£0 16	0
75	for 4 „	„	1 0	0
95	for 5 „	„	1 11	8
120	for 6 „	„	2 8	0
80 15s.	for 3 „	„	0 16	$1\frac{3}{4}\frac{1}{5}$
160 18s.	for 7 „	„	3 15	$1\frac{1}{2}\frac{1}{5}$
195 12s. 6d.	for 9 „	„	5 17	$4\frac{1}{2}$
85	for 4 „	at £2 per cent.	0 11	4
75 17s. 6d.	for 8 „	„	1 0	$2\frac{3}{4}\frac{1}{5}$
87 15s.	for 9 „	„	1 6	$3\frac{3}{4}\frac{3}{5}$
145 12s. 6d.	for 10 „	„	2 8	$6\frac{1}{2}$
80 7s. 6d.	for $4\frac{1}{2}$ „	„	0 12	$7\frac{1}{2}\frac{7}{10}$
160 17s. 6d.	for $5\frac{1}{4}$ „	„	1 8	$1\frac{3}{4}\frac{7}{10}$

To calculate the interest of any sum of money at £$4\frac{1}{2}$ per cent. for months:—

RULE.—Multiply the principal in pounds by 9, and divide by 10, the quotient will be the interest, in pence, for 1 month, which multiply by the number of months. Or, find the interest at £6 per cent., and deduct from it $\frac{1}{4}$ of the amount at £6 per cent., the remainder will be the interest at £$4\frac{1}{2}$ per cent.; or, find the interest for 1 month at £6 per cent, and multiply it by $\frac{3}{4}$ of the months.

EXAMPLES.

Required the interest of £80, for 4 months, at £$4\frac{1}{2}$ per cent.?

£80 Or 5)80

9 16 sixpences = 8s. in. for 1 mo.

10)720 4

72d. = 6s. = interest for 1 mo. £1 12 do. 4 do. at [6 p. c.

4 Deduct $\frac{1}{4}$ of £1 12 = 8

Ans. £1 4s. Interest for 4 mos. Ans. £1 4s. as before.

Or, the interest of £80 for 1 month is 8s. and 8s. × $\frac{3}{4}$ of 4 months = 8s. × 3 = £1 4s. as before.

Required the interest of £160 10s. for 6 months at $4\frac{1}{2}$ per cent. ?

£160½
9

10)1444½

144$\frac{9}{20}$d. = s. 12 D. 0¼ $\frac{4}{6}$ = Interest for 1 month.
6

Ans. £3 12s. 2½d. $\frac{4}{6}$ = Interest for 6 months.

Required the interest of £78 15s. for 5 months, at $4\frac{1}{2}$ per cent. ?

£
5)78¾

15¾ sixpences = s. 7 D. 10½ = int. for 1 mo. at 6 p. c.
5

In. for 5 mos. at 6 p. c.	£1	19	4½
Ded. ¼ of £1 19 4½ =	0	9	10$\frac{9}{4}$ $\frac{1}{2}$

Ans. £1 10s. 6¼d. $\frac{1}{2}$

What is the interest of £124 6s. 8d. for 4 months at £4½ per cent. ?

Ans. £1 17s. 3½d. $\frac{2}{6}$

Required the interest of £185 for 5½ months, at £4½ per cent. ?

Ans. £3 16s. 3¾d.

Calculate the interest on the following sums at £4½ per cent.

£70	0	0	for	4	months,	£1	1	0
85	0	0	for	5	„	1	11	10½
120	15	0	for	6	„	2	14	4$\frac{1}{20}$
180	12	6	for	7	„	4	14	9¾ $\frac{3}{25}$
146	7	6	for	9	„	4	18	9½ $\frac{2}{6}$
187	17	6	for	10	„	4	1	7¾ $\frac{1}{2}$
120	0	0	for	8½	„	3	16	6
80	12	6	for	3½	„	1	1	1¾ $\frac{7}{8}$
40	7	6	for	2¼	„	0	6	9¾ $\frac{1}{10}$
130	12	6	for	1½	„	0	14	8¼ $\frac{3}{8}$

To calculate the interest of any sum of money for months at £3¾ per cent.

RULE.—Multiply the principal in pounds by 3 and divide by 4, the quotient is the interest, in pence, for 1 month, which multiply by the number of months; or, ¾ of the principal in pounds is the interest of that sum, in pence, for 1 month at £3¾ per cent.

EXAMPLES.

Required the interest of £80 for 4 months, at £3¾ per cent.?

£80
3

4)240

60d. = 5 0 = Interest of 1 month.
4

Ans. £1 0 0 = Interest for 4 months at £3¾ p. cent.

What is the interest of £95 12s. 6d. for 5 months at £3¾ per cent.?

Ans. £1 9s. 11½d. ⅛.

What is the interest of £135 for 8 months at £3¾ per cent.?

Ans. £3 7s. 6d.

Required the interest of £70 6s. 8d. for 3½ months, at £3¾ per cent.?

Ans. 15s. 4½d. ½.

Calculate the interest on the following sums at £3¾ per cent.

£80	for 2 months	£
75	for 3 ,,	
98 6s. 8d.	for 4 ,,	
125	for 5 ,,	
180 17s. 6d.	for 4 ,,	
90 10s.	for 7 ,,	
145 13s. 4d.	for 8 ,,	
186 10s.	for 3½ ,,	
189 15s.	for 2½ ,,	
80	for 3¾ ,,	

140 for one year and 8 months.

To calculate the interest of any sum of money for months at £3⅓ per cent.

RULE.—Multiply the principal in pounds by 2 and divide by 3, the quotient will be the interest for 1 month, in pence, which multiply by the number of months. Or, ⅔ of the principal is the interest of that sum, in pence, for 1 month at £3⅓ per cent.

EXAMPLES.

What is the interest of £175 10s. for 5 months, at £3⅓ per cent. ?

£			
175½			
2			
3)351			
117d. =	£0	9	9 = Interest for 1 month.
			5
Ans.	£2	8	9 = Interest for 5 months.

Calculate the interest on the following sums at £3⅓ per cent.

£75	for 4 months	£0 16	8
80	for 5 „	1 2	2½
140	for 6 „	2 6	8
85 10s.	for 3 „	0 14	3
90 7s. 6d.	for 4 „	1 0	1
120 12s. 6d.	for 7 „	2 6	10¾. ⅔
235 15s.	for 8 „	5 4	9¼. ⅓
24 10s.	for 3⅓ „	0 4	9⅓
120	for 1 year 2 months	4 13	4

To calculate the interest of any sum of money for months at £1½ per cent.

RULE.—Divide the principal in pounds by 40, the quotient is the interest of that sum for 1 month, in shillings. Or $\frac{1}{40}$ part of the principal, in pounds, is the interest for one month, in shillings, which multiply by the number of months.

EXAMPLES.

Required the interest of £84 for 4 months at £1½ per cent.?

£
40)84

$2\frac{1}{10}$s. = £0 2 $1\frac{9}{4}$. $\frac{4}{5}$ = Interest for 1 month.
4

Ans. £0 8 $4\frac{3}{4}$. $\frac{1}{5}$ = Interest for 4 months.

What is the interest of £245 for 1 year and 2 months at £1½ per cent.?—(1 yr. 2 mos. = 14 months.)

£
40)245

$6\frac{1}{8}$s. = £0 6 $1\frac{1}{2}$ = Interest for 1 month.
14

Ans. £3 5 9 = Interest for 1 yr. 2 mos.

Calculate the interest on the following sums at £1½ per cent.

£70	for 3 months.	£0	5	3	
95	for 4 „	0	9	6	
185 10s.	for 5 „	1	3	$2\frac{1}{4}$	
160 15s.	for 6 „	1	4	$1\frac{1}{4}$	$\frac{2}{4}$
80 12s. 6d.	for $9\frac{1}{2}$ „	0	19	$1\frac{3}{4}$	$\frac{1}{8}$
120 7s. 6d.	for 1 year 8 months.	3	0	$2\frac{1}{4}$	

To find the interest of any sum of money for months at £1½ per cent.?

RULE.—The principal in pounds, divided by 4, will be the interest of that sum for 1 month, in pence. Or, the interest for 1 month, at £1½ per cent., is ¼ of the principal, considered as pence which multiply by the number of months.

EXAMPLES.

Required the interest of £76 for 3 months, at £1½ per cent?

£
4)76

19d = £0 1 7 = Interest for 1 month.
3

Ans. £0 4 9 = Interest for 3 months.

What is the interest of £124 7s. 6d. for 4 months at £1¼ per cent.—(7s. 6d. = ⅜ of £1).

£
4)124⅜

$31\frac{3}{32}$d. = £0 2s. $7\frac{3}{32}$ = Interest for 1 month.
4

Ans. £0 10 $4\frac{1}{4}$ $\frac{1}{2}$ = Interest for 4 months.

Calculate the interest on the following sums at £1¼ per cent.:—

£120		for 3 months.		£0	7	6	
80	10s.	„ 4 „		0	6	$8\frac{1}{2}$	
180	17s. 6d.	„ 5 „		0	18	$10\frac{3}{32}$	
240	12s. 6d.	„ 6 „		1	10	$0\frac{3}{4}$	$\frac{3}{4}$
176	7s. 6d.	„ 8 „		1	10	$4\frac{3}{4}$	
230		„ 9 „		2	3	1	
84	for 1 year and 6 months.			1	11	6	
240	for 1 year and 8 months.			5	0	0	

In the preceding rules for the calculating of interest, a rule, for every different given rate of interest, is given.—The following rule for the calculating of interest and of commission, will answer for every rate of interest, at from £½ per cent., and upwards:—

As it has already been demonstrated that the interest of £1 for 1 month, at £5 per cent., is 1d., so the interest of £1 for the same period of time, at £½ per cent., must be $\frac{1}{10}$d.

To find the interest of any sum of money for months, at £½ per cent. and upwards; also for years:—

RULE.—Divide the principal in pounds by 10, the quotient will be the interest, in pence, for 1 month, at £½ per cent. which, multiplied by the number of months, will be the interest for the given time, at £½ per cent; when the rate is more than £½ per cent., multiply the interest at £½ per cent., for 1 month, by double the given rate, the product will be the interest of the given sum for 1 month at the given rate, which multiply by the number of months, and the product will be the interest for the required time, at the given rate.—

And to find the interest for 1 year, instead of considering the quotient pence, consider it shillings, which will be the interest of the sum for 1 year in shillings, at £½ per cent., and at any other rate calculate as above directed.

EXAMPLES.

Required the interest of £155 for 3 months at £¾ per cent.?

£
10)155

15½d. = £0 1 3½ = Interest for 1 mo. at £½ p. c.
1½ = ¾ × 2

£0 1 11½ = Interest for 1 mo. at £¾ p. c.
3

Ans. £0 5 9¾ = Interest for 3 mos. at £¾ p. c.

What is the interest of £127 for 1 year at £1½ per cent.?

£
10)127

12$_{10}^{7}$s. = £0 12 8¼ $\frac{3}{5}$ = Interest for 1 year at
3 = 1½ × 2 [£½ p. c.

Ans. £1 18 1$_{4}^{0}$ $\frac{4}{5}$ = Interest for 1 year at
[£1 p. c.

Required the interest of £240 10s. for 4 months at £1⅜ per cent.?

£
10)240½

24$_{20}^{1}$d. = £0 2 0$_{20}^{1}$ = Interest for 1 months at
2¾ = 1⅜ × 2 [£½ p. c.

£0 5 6$_{80}^{11}$ = Interest for 1 month at
4 [£1⅜ p. c.

Ans. £1 2 0$_{20}^{11}$ = Interest for 4 months at
Or, Ans. £1 2 0½ $\frac{1}{5}$ [£1⅜ p. c.

Required the commission on £1005 at £1½ per cent. ?

£
10)1005

100½s. = £5 0 6 = Commission at £½ per cent. ?
2½ = 1½ × 2

Ans. £12 11 3 = Commission at £1½ per cent.

Required the interest of £475 for 7 months at £5½ per cent. ?

£
10)475

47½d. = £0 3 11½ = Interest for 1 mo. at £½ p. c.
11 = 5½ × 2

£2 3 6½ = Interest for 1 mo. at £5½ p. c.
7

Ans. £15 4 9½ = Interest for 7 months at £5½ per cent.

Required the interest of £376 for 5 months at £6 per cent. ?

£
10)376

37⅗d. = £0 3 1½ ⅖ = Interest for 1 month at
12 = 6 × 2 [£½ per cent.

£1 17 7½ ⅘ = Interest for 1 mo. at £6 p. c.
5

Ans. £9 8 0 = Interest for 5 mos. at £6 p. c.

What will the commission on £1500 amount to at £⅛ per cent. ?

NOTE.—£⅛ per cent. is ¼ of £½ per cent.—£⅛ per cent. is ⅔ of £¼ per cent., and £¼ per cent. is ½ of £½ per cent. Therefore, to find the commission at £⅛ per cent., find it first at £½ per cent., and take ¼ of the amount at £½ per cent.;

for £$\frac{1}{8}$, take $\frac{1}{8}$ of that at £$\frac{1}{2}$ per cent., and £$\frac{1}{4}$ per cent., take $\frac{1}{2}$ of that at £$\frac{1}{2}$ per cent.

£
10)1500

150s. = £7 10 0 = Commission at £$\frac{1}{2}$ per cent., and $\frac{1}{4}$ of £7 10 0 = £1 17s. 6d. = Commission at £$\frac{1}{8}$ per cent.?

What is the commission on £760 6s. 8d. at £$\frac{1}{4}$ per cent.?

£
10)760$\frac{1}{3}$

76$\frac{1}{30}$s. = £3 16 0$\frac{1}{4}$ $\frac{9}{15}$ = Commission at £$\frac{1}{8}$ per c., and $\frac{1}{2}$ of £3 16s. 0$\frac{1}{4}$d. $\frac{9}{15}$ is £1 18s 0$\frac{1}{4}$d. $\frac{3}{5}$ = Commission at £$\frac{1}{4}$ per cent.?

Required the commission on £520 at £$\frac{1}{8}$ per cent.?

£
10)520

52s. = £2 12 0 = Commission at £$\frac{1}{2}$ per cent., and $\frac{3}{8}$ of £2 12s. = £1 14 8 = Commission at £$\frac{1}{8}$ per cent.

CALCULATE THE INTEREST ON THE FOLLOWING SUMS :—

£160	for 2 months	at	£2$\frac{1}{2}$	per	cent.	£0	13	4
45 10s.	for 3 „	„	£3$\frac{1}{4}$	„	„	0	7	4$\frac{1}{2}$ $\frac{9}{10}$
185	for 4 „	„	£4$\frac{1}{8}$	„	„	2	10	10$\frac{1}{2}$
340 17s. 6d.	for 6 „	„	£4$\frac{3}{4}$	„	„	8	1	10$\frac{3}{4}$ $\frac{13}{20}$
541	for 1 year	„	£4$\frac{7}{8}$	„	„	26	7	5$\frac{1}{2}$ $\frac{4}{5}$
80 15s.	for 1 year	„	£6	„	„	4	16	10$\frac{3}{4}$ $\frac{1}{5}$

CALCULATE THE COMMISSION ON THE FOLLOWING SUMS :—

£187 10s.	at	£$\frac{1}{4}$	per	cent.	£0	18	9
190	at	£1$\frac{1}{8}$	„	„	2	2	9
1104	at	£1$\frac{7}{8}$	„	„	20	14	0
876 17s. 6d.	at	£2$\frac{1}{8}$	„	„	18	12	8$\frac{1}{16}$
594 10s.	at	£2$\frac{1}{4}$	„	„	14	17	3
810 15s.	at	£2$\frac{3}{4}$	„	„	22	5	10$\frac{3}{4}$ $\frac{4}{5}$

To calculate Interest for days, at £5 per cent. :—

It has already been proved that the Interest of £1, for 1 month, at £5 per cent., is 1d.; and, therefore, the Interest of £1 for 1 day, at the same rate, must be $\frac{12}{365}$d., or $\frac{1}{30}$ $_{1}\frac{5}{2}$d. From this the following rule, for finding Interest for days at £5 per cent., is deduced.

To find the Interest of any sum of money, for days, at £5 per cent. :—

Rule.—Divide the principal, in pounds, by $30_{1}\frac{5}{2}$, the quotient, considered as pence, will be the interest of the sum for 1 day, which multiply by the given number of days, and the product will be the interest of the given sum for the time required.; or, if the days will divide by $30_{1}\frac{5}{2}$, without leaving any remainder, the quotient will be months, then calculate as for months at £5 per cent.

Otherwise: As $30_{1}\frac{5}{2}$ is not a very convenient number to divide by, another method may be adopted, and by which the interest in all ordinary transactions may be found with sufficient accuracy Thus: in calculating interest for months, 12 months are 1 year, now, if the year consisted of 360 days, there would be 30 days in each month, but as there are 365 days in a year, there are, as above stated, $30_{1}\frac{5}{2}$ days in 1 month of a year of 365 days, hence, dividing any number by 360, instead of 365, must give a quotient as much greater as the part which 5 is of 365, which is $\frac{1}{73}$; and, if any number be divided by 365, and the same number divided by 360, and if from this last quotient there be deducted $\frac{1}{73}$ of it, the remainder will be the same as the quotient arising from dividing by 365.

Rule.—Divide the principal, in pounds, by 30, the quotient, considered as pence, will, after deducting 1d. for every 6s., be the interest for 1 day, which multiply by the number of days. Or, the operation may be simplified, thus: divide the principal by 10, and multiply the quotient by $\frac{1}{3}$ of the days, deducting as before 1d. for every 6s.

By this rule it has been shown that the interest found will be too much by $\frac{1}{73}$ part of its amount, therefore, in order to correct this, 1 penny for every 6 shillings of interest must be deducted.

Note.—This does not give the interest quite correct, as 1d. for every 6s. is $\frac{1}{72}$; but it will be found sufficiently correct for all ordinary transactions; and this method of calculating is much simpler than the other, which gives the true result.

EXAMPLES.

Required the interest of £1095 for 20 days at £5 per cent. ?

£
$30\frac{5}{1\,0}$)1095

36d. = £0 3 0 = Interest for 1 day at £5 p. c.
20

Ans. £3 0 0 = Interest for 20 days at £5 p. c.

Or,

£
10)1095

$109\frac{1}{2}$d. = £0 9 $1\frac{1}{2}$ = Interest for 3 days.
$6\frac{2}{3}$ = $\frac{1}{3}$ of 20

£3 0 10 = Interest for 20 days.
10 Deduct 10d. = 1d. for each 6s.
of interest found by this method.

Ans as before. £3 0 0

Required the interest of £450, for 60 days, at £5 per cent. ?

£
10)450

45d. = £0 3 9 = interest for 3 days.
20 = $\frac{1}{3}$ of 60.

£3 15 0
1 $0\frac{1}{2}$ deduct 1s. $0\frac{1}{2}$d. = 1d. for each 6s. of [interest.

Ans. £3 13 $11\frac{1}{2}$ = interest for 60 days.

Required the interest of £621, 10s., for 45 days, at £5 per cent. ?

£ s.
10)621 10

$62\frac{3}{20}$d. = £0 5 $2\frac{3}{20}$ = Interest for 3 days.
15 = $\frac{1}{3}$ of 45.

£3 17 $10\frac{1}{4}$
1 3 Deduct 1s. 3d., which is only a little more than 1d. for every 6s. of interest, found by this method.

Ans. £3 16 $7\frac{1}{4}$

The answer thus found is about $\frac{1}{2}$d. too little.

Required the interest of £145, for 120 days, at £5 per cent. ?

£
10)145

14½d. = £0 1 2½ = Interest for 3 days.
40 = ⅛ of 120.

£2 7 6
8 Deduct 8d., which is only about ⅛ of a farthing more than 1d. for every 6s. of interest found by this method.

Ans. £2 6 10

Required the interest of £1200, for 17 days, at £5 per cent. ?

£
10)1200

3)120d. = £0 10 0 = Interest for 3 days.

40d. = £0 3 4 = Interest for 1 day.
17

£2 16 8 = Interest for 17 days.
9½ Deduct 9½d., which is only a little more than 1d. for every 6s.

Ans. £2 15 10½

NOTE.—When the days are not such a number as contain 3 an even number of times, it will often be found more convenient to divide the interest found for 3 days by 3, or the principal by 30, and multiply by the whole number of days, as is done in the above example.

CALCULATE THE INTEREST ON THE FOLLOWING SUMS :—

£147	for 30 days	at £5	per cent.	£0 12 1
180 10s.	for 39	„	„	0 19 3¼
240	for 120	„	„	3 18 11
375	for 75	„	„	3 17 0½
180	for 19	„	„	0 9 4½
1400	for 49	„	„	9 7 10 11/12

To calculate the interest at any other rate than £5 per cent. :—

Find the interest at £5 per cent., and then whatever part or parts the given rate is of 5, take the same part or parts of that found at £5 per cent., as the given rate is of 5. Thus: if at £2 per cent. take $\frac{2}{5}$ of that found at £5 per cent., if at 3 per cent. $\frac{3}{5}$, if at $3\frac{1}{2}$, $\frac{7}{10}$, &c.; and if at £6 per cent., multiply that found at £5 per cent. by $1\frac{1}{5}$; if at £$6\frac{1}{2}$, by $1\frac{3}{10}$; if at £7 per cent., by $1\frac{2}{5}$; if at £$7\frac{1}{2}$ per cent., by $1\frac{1}{2}$, &c.

PROFIT AND LOSS;
OR, GAIN OR LOSS PER CENT.

To find at what goods, bought or manufactured, should be sold at, so that a certain gain or loss per cent. may be realized or sustained.

RULE.—Add to, or subtract from, the prime cost the same part or parts of it that the rate per cent. to be gained or lost is of 100, their sum, in the case of gain, or their difference, in that of loss, will be the selling price.

EXAMPLES.

Bought goods at 16s., at what must they be sold, in order to gain £$12\frac{1}{2}$ per cent.?

£$12\frac{1}{2}$ = $\frac{1}{8}$ of 100. $\frac{1}{8}$)16 s.
2

Ans. 18s. Selling price.

Bought tea at 7s. 6d. per lb.; what must it be sold at to gain £10 per cent.?

£10 = $\frac{1}{10}$ of 100. $\frac{1}{10}$)7 s. 6 d.
9

Ans. 8 3 Selling price.

Bought sugar at $6\frac{1}{2}$d. per lb., by which there was lost £$8\frac{1}{3}$ per cent. Required the price at which it was sold per lb.?

£$8\frac{1}{3}$ = $\frac{1}{12}$ of 100. $\frac{1}{12}$)$6\frac{1}{2}$ d.
$\frac{1}{2}$ $\frac{1}{6}$

Ans. $5\frac{3}{4}$ $\frac{5}{6}$ Selling price per lb.

Bought cloth at 12s. 6d. per yard, by which there was lost £8⅓ per cent.; what was it sold at per yard?

Ans. 10s. 11¼d.

Bought cloth at 12s. 9d. per yard, at what must it be sold at per yard so as to gain £25 per cent.?

Ans. 15s. 11¼d.

What must goods, which cost 18s., be sold at, to gain £15 per cent.?

Ans. £1 0s. 8¼d. $\frac{3}{5}$.

It is a very common practice in mercantile transactions to allow the purchaser a discount for Cash (ready money), or credit for a stated period of time. In the preceding method of finding a selling price such as will gain or lose a certain rate per cent., neither of these is taken under consideration, nor is it considered that this subject is so well understood as it should be, and ought to be, as there is little doubt but that the want of a correct knowledge of transacting business on this method has been a great cause of many having been unsuccessful; and that the want of this knowledge may prove injurious to the disposer will, it is thought, be satisfactorily proved by the two following Examples.

Ex. I.—Suppose goods to be bought for £2, at what should they be sold in order to realize a profit of £5 per cent., and allow £2½ per cent. discount?

In such cases as that in the preceding example, it is by some held to be equivalent to calculating for a selling price such as would give a profit of £7½ per cent., and thus they are led into error, with seeming truth on their side.—(The sum of 5 and 2½ is 7½.)

£7½ = $\frac{3}{40}$ of 100.

	£	s.	d.	
$\frac{3}{40}$)	2	0	0	
	0	3	0	
	£2	3	0	Selling price.
Discount on £2, 3s., at 2½ per cent. is	0	1	$0\frac{3}{4}$	$\frac{3}{8}$
Ans.	£2	1	$11\frac{1}{4}$	$\frac{5}{8}$

By this method the disposer receives only £2, 1s. $11\frac{2}{4}$d. $\frac{2}{5}$; whereas, to have gained £5 per cent., he should have had, after allowing £$2\frac{1}{2}$ per cent. discount, £2, 2s.; the difference here being only 3 farthings, and 3 fifths of a farthing, may be considered as a mere trifle, but had the transaction amounted to £200, or £300, the difference would have amounted to 15s., or to £1, 2s. 6d.

Ex. 2.—Suppose cloth to be bought at 10s. per yard, at what rate must it be sold per yard, in order to gain £5 per cent.; and allow £5 per cent. discount? (The sum of 5 and 5 is 10.)

£10 is $\frac{1}{10}$ of 100.

	s.	
$\frac{1}{10}$)	10	
	1	
	11	Selling price.
Off £5 per cent. discount	0	$6\frac{3}{5}$
Ans.	10	$5\frac{2}{5}$

In this, as in the former example, the money which the disposer receives is not equal to £5 per cent. on the prime cost; to realise this he should receive 10s. 6d.

To find from the prime cost a selling price which will gain any required rate per cent., after allowing the purchaser a certain discount or credit:—

Rule.—To the prime cost add the same part or parts of it as the rate per cent. to be gained is of 100, and to their sum add, not the same part or parts of it as the discount is of 100, but that part or parts of it which is represented by a fraction having the same numerator as that which represents the part or parts which the discount is of one hundred, but a denominator less by 1 (unity) than it.

EXAMPLES.

Bought goods at £2, 10s., at what must they be sold in order to gain £25 per cent., and allow £$12\frac{1}{2}$.

£25 = $\frac{1}{4}$ of 100.

	£	s.	d.
	2	10	0
	0	12	6
	3	2	6

£$12\frac{1}{2}$ = $\frac{1}{8}$ of 100, and $\frac{1}{7}$ of £3, 2s. 6d. is 0 8 $11\frac{1}{7}$

Ans. £3 11 $5\frac{1}{7}$ Selling price.

Bought cloth at 19s. 6d. per yard, at what must it be sold per yard, in order to realize a profit of £15 per cent., and allow a discount of £20 per cent. ?

£15 = $\frac{3}{20}$ of 100.

	£	s.	d.
$\frac{3}{20}$)	0	19	6
	0	2	$11\frac{1}{10}$
	1	2	$5\frac{1}{10}$

£20 = $\frac{1}{5}$ of 100, and $\frac{1}{4}$ of £1, 2s. $5\frac{1}{10}$ is 0 5 $7\frac{1}{40}$

Ans. £1 8 $0\frac{3}{8}$ Selling price.

Bought goods for £1, and after having sold the same, allowing to the purchaser £5 per cent. discount, found that a loss of £$2\frac{1}{2}$ per cent. had been sustained; required the selling price ?

£$2\frac{1}{2}$ = $\frac{1}{40}$ of £100

	£	s.	d.
$\frac{1}{40}$)	1	0	0
	0	0	6
	0	19	6

£5 = $\frac{1}{20}$ of 100 and $\frac{1}{19}$ of 19s 6d. is 0 1 $0\frac{6}{19}$

Ans. £1 0 $6\frac{6}{19}$ = £1 0s. $6\frac{1}{4}$d. $\frac{5}{19}$ = Selling price.

Bought barley at £1 5s. per quarter, at what must it be sold, in order to gain £25 per cent., and allow £$33\frac{1}{3}$ per cent. discount ?

£25 = $\frac{1}{4}$ of 100

	£	s.	d.
$\frac{1}{4}$)	1	5	0
		6	3
	1	11	3

£$33\frac{1}{3}$ = $\frac{1}{3}$ of 100 and $\frac{1}{3}$ of £1 11s. 3d. is 0 15 $7\frac{1}{2}$

Ans. £2 6 $10\frac{1}{2}$ Selling price.

Bought tea at 5s. 6d. per lb., at what must it be sold per lb. in order to gain £10 per cent., and allow credit for 6 months at £5 per cent. per annum ?

NOTE.—The credit is equal to £$2\frac{1}{2}$ per cent discount.

£10 = $\frac{1}{10}$ of 100

	s.	d.
$\frac{1}{10}$)	5	6
		$6\frac{1}{2}$ $\frac{2}{5}$

*£$2\frac{1}{2}$ = $\frac{1}{40}$ of 100, and $\frac{1}{3\frac{1}{3}}$ of 6s. $\frac{1}{2}$d. $\frac{2}{5}$ is

	6	$0\frac{1}{2}$	$\frac{2}{5}$
0		$1\frac{3}{4}$	$\frac{2}{5}\frac{2}{5}$

Ans. 6 $2\frac{1}{4}$ $\frac{11}{13}$ Nearly 6s. $2\frac{1}{4}$d.

Bought cloth at 7s. 6d per yard, at what must it be sold to gain £15 per cent?

Ans. 8s. $7\frac{1}{2}$d.

Bought wheat at £1 18s per quarter, and sold it at £$12\frac{1}{2}$ per cent. profit; required the selling price?

Ans. £2 2s. 9d.

Bought wheat at £1 18s. per quarter, at what must it be sold per quarter, in order to realise a profit of £$12\frac{1}{2}$ per cent., and allow a discount of £$2\frac{1}{2}$ per cent.?

Ans. £2 3s. $9\frac{3}{4}$d. $\frac{3}{10}$

If there is gained by selling tea, £20 per cent., which cost 6s. 8d. per lb.; required the price at which it was sold?

Ans. 8s.

Bought goods at 6s. 8d., at what must they be sold in order to realise a profit of £20 per cent., and allow a discount of £50 per cent.?

Ans. 16s.

DISCOUNT.

Discount is the sum which ought to be deducted from the amount of a bill or debt due at some future period, when paid before the expiry of that period.

Bankers and others who discount bills usually charge interest on the amount of the bill for the time which it has to run; this method, however, is erroneous, because more is retained than the true discount, and consequently the present worth of the bill or debt is made too little. Or, in other

*£$2\frac{1}{2}$ per cent. for 1 year = £5 per cent. for 6 months.

words, the banker gets more than the true discount, and the holder of the bill less than its true present worth. After the discount is deducted from the amount of the bill the holder should receive such a sum as would, if laid out at the same rate of interest till the bill becomes due, amount to the original sum.

The true discount on a bill of £100 due 12 months hence at £5 per cent., is not £5 as is usually charged, but only $£4\frac{6}{21}$ equal to £4 15s. $2\frac{2}{7}$d. $\frac{4}{7}$. After deducting this from the amount of the bill, the holder receives $£95\frac{6}{21}$, equal to £95 4s. $9\frac{9}{7}$d. $\frac{4}{7}$, which, if laid out at £5 per cent, will, at 12 months, amount to £100.

The limits to which the present work is necessarily confined will not permit of my discussing this subject at greater length, even were I competent for the task; and, therefore, without entering upon any formal demonstration, I just place opposite to each other the part or parts of the amount usually charged or retained as discount, and the true part or parts of the amount which should be retained at different rates, and at 12 months date.

At £5 per cent.

The usual charge.	The true charge.
$\frac{1}{20}$ of the amount.	$\frac{1}{21}$ of the amount.

At £4½ per cent.

$\frac{9}{200}$ of the amount.	$\frac{9}{209}$ of the amount.

At £4 per cent.

$\frac{1}{25}$ of the amount.	$\frac{1}{26}$ of the amount.

At £3½ per cent.

$\frac{7}{200}$ of the amount.	$\frac{7}{207}$ of the amount.

At £3 per cent.

$\frac{3}{100}$ of the amount.	$\frac{3}{103}$ of the amount.

At £2½ per cent.

$\frac{1}{40}$ of the amount.	$\frac{1}{41}$ of the amount.

At £2 per cent.

$\frac{1}{50}$ of the amount.	$\frac{1}{51}$ of the amount.

From the above it will be seen that as the discount decreases, the difference between the true discount and that usually charged diminishes, hence the higher the discount is per cent., the greater is the loss to the holder of a bill when discounted, whereas by the method here proposed, the holder of the bill would receive at every rate, just such a sum as would at the same rate of interest amount to the original sum by the time the bill becomes due.

Required the true discount of a bill of £120 due 12 months hence, at £5 per cent.; also, the difference of the present worth when the true discount is deducted, and when the usual discount is deducted?

Ans. £5$\frac{5}{7}$, true discount. The present worth is according to the true method of charging the discount £$\frac{2}{7}$ = 5s. 8$\frac{4}{7}$d. $\frac{3}{7}$ greater than that received by the usual method of discounting bills.

Required the true discount and that of the usual on a bill of £410, due 12 months hence, at £2$\frac{1}{2}$ per cent.?

Ans. £10, the true discount. £10 5s. by the usual method.

ADDITIONAL EXERCISES.

26	at	3d.	each.	£0	6	6
28	at	3d.	„	0	7	0
17	at	4d.	„	0	5	8
25	at	4d.	„	0	8	4
25	at	5d.	„	0	10	5
30	at	5d.	„	0	12	6
35	at	5d.	„	0	14	7
34	at	6d.	„	0	17	0
43	at	6d.	„	1	1	6
40	at	7d.	„	1	3	4
45	at	7d.	„	1	6	3
50	at	8d.	„	1	13	4
80	at	9d.	„	3	0	0
112	at	9d.	„	4	4	0

120	at	10d.	each.	£5	0	0
84	at	11d.	„	3	17	0
100	at	11d.	„	4	11	8
24	at	2½d.	„	0	5	0
29	at	2¼d.	„	0	5	5¼
30	at	2½d.	„	0	6	3
39	at	3¼d.	„	0	10	6¾
40	at	3½d.	„	0	11	8
42	at	3¾d.	„	0	13	1½
45	at	4¼d.	„	0	15	11¼
47	at	5½d.	„	1	1	6½
58	at	5¾d.	„	1	7	9½
68	at	6¼d.	„	1	15	5
75	at	7½d.	„	2	6	10½
80	at	9¼d.	„	3	1	8
112	at	9½d.	„	4	8	8
98	at	2⅝d.	„	0	17	4¼
112	at	3⅜d.	„	1	11	6
48	at	4⅛d.	„	0	16	9½ ⅔
44	at	5⅞d.	„	1	1	6½
84	at	6 1/12d.	„	2	6	1
24¼	at	3d.	„	0	6	0¾
26½	at	4d.	„	0	8	10
30¾	at	5d.	„	0	12	9¾
34⅛	at	6d.	„	1	17	0¾
40⅝	at	7d.	„	1	3	8⅜
87⅞	at	8d.	„	2	17	11
96 5/12	at	8d.	„	3	4	3⅓
96 7/12	at	9d.	„	3	12	5¼
102⅛	at	10d.	„	4	5	5
144¼	at	10d.	„	6	0	2½
44 9/16	at	8d.	„	1	9	8½
72	at	3s.	„	10	16	0
84	at	2s. 4d.	„	9	16	0
96½	at	4s. 3d.	„	20	10	1½

$36\frac{1}{4}$	at	2s. 6d.	each.	£4	10	$7\frac{1}{2}$
$48\frac{1}{8}$	at	5s. 3d.	„	12	12	$7\frac{3}{4}$ $\frac{1}{2}$
$97\frac{1}{4}$	at	10s. 4d.	„	50	4	11
$108\frac{1}{2}$	at	12s. 6d.	„	67	16	3
$99\frac{1}{3}$	at	4s. 4d.	„	21	10	$5\frac{1}{3}$
$24\frac{1}{2}$	at	2s. $1\frac{1}{2}$d.	„	2	12	$0\frac{3}{4}$
$36\frac{1}{8}$	at	6s. $1\frac{1}{2}$d.	„	11	1	$3\frac{0}{4}$ $\frac{3}{4}$
104	at	$\frac{1}{8}$d.	„	0	1	1
150	at	$\frac{1}{6}$d.	„	0	2	6
180	at	$\frac{17}{2}$d.	„	0	8	9
144	at	2s. 6d.	„	18	0	0
168	at	3s. 4d.	„	28	0	0
192	at	5s. 3d.	„	50	8	0
240	at	7s. 6d.	„	90	0	0
268	at	$7\frac{1}{2}$d.	„	8	7	6
25	at	$5\frac{3}{4}$d.	„	0	11	$11\frac{3}{4}$
170	at	$9\frac{1}{4}$d.	„	6	11	$0\frac{1}{2}$
180	at	$3\frac{1}{2}$d.	„	2	12	6
240	at	1s. 6d.	„	18	0	0
180	at	2s. 6d.	„	22	10	0
70	at	2s. $1\frac{1}{2}$d.	„	7	8	9
81	at	2s. $7\frac{1}{2}$d.	„	10	12	$7\frac{1}{2}$
620	at	3s. $10\frac{1}{2}$d.	„	120	2	6
54	at	3s. $1\frac{1}{2}$d.	„	8	8	9
$18\frac{5}{8}$	at	4s. 6d.	„	4	3	$9\frac{3}{4}$
$17\frac{1}{4}$	at	3s. $4\frac{1}{2}$d.	„	2	18	$2\frac{1}{2}$ $\frac{1}{2}$
$27\frac{5}{8}$	at	2s. 1d.	„	2	17	$8\frac{0}{4}$ $\frac{1}{2}$
65	at	3s. $1\frac{1}{2}$d.	„	10	3	$1\frac{1}{2}$
86	at	2s. $10\frac{1}{4}$d.	„	12	7	3
140	at	3s. 6d.	„	24	10	0
75	at	2s. $7\frac{1}{2}$d.	„	9	16	$10\frac{1}{2}$
60	at	$5\frac{1}{3}$d.	„	1	5	$7\frac{1}{2}$
$72\frac{3}{4}$	at	2s. $1\frac{1}{2}$d.	„	7	14	$7\frac{0}{4}$ $\frac{1}{2}$
126	at	1s. 8d.	„	10	10	0
109	at	2s. 6d.	„	13	12	6
180	at	5s. 4d.	„	48	0	0
$19\frac{5}{12}$	at	2s. 4d.	„	2	5	$3\frac{1}{2}$ $\frac{2}{3}$

$7\frac{6}{16}$	at	5½d.	each.	£0	3	$2\frac{1}{4}$	$\frac{9}{16}$
$14\frac{7}{8}$	at	2s. 7½d.	„	1	19	$0\frac{1}{2}$	$\frac{1}{4}$
180	at	5s. 6d.	„	49	10	0	
192	at	6s. 8d.	„	64	0	0	
204	at	7½d.	„	6	7	6	
186	at	2s. 9d.	„	25	11	6	
84	at	6s. 8d.	„	28	0	0	
72	at	8¾d.	„	2	12	6	
96	at	4½d.	„	1	16	0	
84	at	5⅛d.	„	1	15	$10\frac{1}{2}$	
76	at	3⅜d.	„	1	1	$4\frac{1}{2}$	
220	at	7s. 6d.	„	82	10	0	
120	at	6s. 1½d.	„	36	15	0	
184	at	9s. 7½d.	„	88	11	0	
75	at	4s. 9d.	„	17	16	3	
85	at	2s. $10\frac{1}{2}$d.	„	12	4	$4\frac{1}{2}$	
40	at	2s. 7½d.	„	5	5	0	
60	at	9s. 9d.	„	29	5	0	
180	at	7s. 7½d.	„	68	12	6	
$88\frac{1}{4}$	at	3¼d.	„	1	3	$10\frac{3}{4}$	$\frac{1}{4}$
$76\frac{5}{8}$	at	4½d.	„	1	8	$8\frac{3}{4}$	$\frac{1}{4}$
$96\frac{3}{5}$	at	2s. 1½d.	„	10	5	$3\frac{1}{4}$	$\frac{1}{5}$
$180\frac{7}{16}$	at	5s. 7½d.	„	50	14	$11\frac{1}{2}$	$\frac{1}{8}$
97	at	$4\frac{3}{4}$d.	„	1	18	$4\frac{3}{4}$	
89	at	3⅛d.	„	1	3	$2\frac{1}{8}$	
102	at	5¼d.	„	2	4	$7\frac{1}{2}$	
$76\frac{1}{2}$	at	5⅛d.	„	1	12	$8\frac{1}{16}$	
$74\frac{5}{16}$	at	3½d.	„	1	1	$8\frac{3}{32}$	
$89\frac{5}{12}$	at	$4\frac{7}{12}$d.	„	1	14	$1\frac{3}{4}$	$\frac{1}{16}$
601	at	1s. 6d.	„	45	1	6	
$37\frac{7}{12}$	at	1s. 7½d.	„	3	1	$0\frac{1}{2}$	$\frac{1}{2}$
$80\frac{5}{12}$	at	$2\frac{3}{4}$d.	„	0	18	$5\frac{9}{4}$	$\frac{7}{12}$
76	at	1s. 9d.	„	6	13	0	
84	at	1s. 7d.	„	6	13	0	
120	at	1s. 6d.	„	9	0	0	
140	at	1s. 9d.	„	12	5	0	
180	at	1s. 5d.	„	12	15	0	

The following examples will show the difference between the usual method of calculating and of that recommended in this work, and for which simple and concise rules and illustrative examples are to be seen in this work.

EXAMPLES.

What will 197 yards of cloth cost at 1s. 7½d. per yard?

USUAL METHODS.

£	s.	d.			£	s.	d.
0	1	7½	× 7	=	0	11	4½
		10					
0	16	3	× 9	=	7	6	3
		10					
8	2	6	× 1	=	8	2	6

Ans. £16 0 1½

Or,

6d. = ½ of 1s.
1½d. = ¼ of 6d.

		197	
		1	
2	197		
4	98	6	
	24	7½	
2,0	32,0	1½	

Ans. £16 0 1½

NEW METHOD.

197 at 1s. £9 17 0
1⅛

Ans. £16 0 1½

What will 720 cost at 2s. 3d. each.

USUAL METHOD.

£	s.	d.			£	s.	d.
£0	2	3	× 0	=	£0	0	0
		10					
£1	2	6	× 2	=	2	5	0
		10					
£11	5	0	× 7	=	78	15	0

Ans. £81 0 0

NEW METHOD.

720 at 1s. = £36
2¼ = 2s 3d

Ans. £81

What will 126½ lbs. of sugar cost, at 7½d. per lb.?

USUAL METHODS.

£	s.	d.						
0	0	7½	×	6½				
		11						
0	6	10½						
		10						
3	15	7½						
0	3	1½						
0	0	3¾						
Ans. £3	19	0¾						

Or,

6d. = ½ of 1s.

1½d. = ¼ of 6d.

¼ of 7½d =

2	126½
4	63
	15 9
	0 3¾

2,0)7,9 0¾

Ans. £3 19 0¾

NEW METHOD.

136½ at 1d. £0 10 6½

7½

£3 19 0¾

If 1 lb. of tea cost 6s. 1½d.; what will 2 cwt., 3 qrs., 12 lbs. cost?

OLD METHOD.

lb.		cwt.	qrs.	lbs.			d.
1	:	2	3	12	:	:	7½
		4					4
		11					30
		28					
		100					
		22					
		320					
		30					
		1)9600					
		4)9600					
		12)2400					
		2,0)20,0					
		£10 Ans.					

NEW METHOD.

200
84
12
24

320 lbs., at 1d., = £1 6 8
7½

Ans. £10 0 0

What is the interest of £180 17s. 6d for 9 months at £5 per cent. ?

USUAL METHODS.

£	s.	d.
180	17	6
		5
9,04	7	6
20		
0,87		
12		
10,50		
4		
2,00		

6 ms. = ½ of 1 yr.
3 ms. = ½ of 6 mo.

	£	s.	d.
2	9	0	10½
	4	10	5¼
	2	5	2⅝
£	6	15	7⅞

Or,

£	s.	d.	
180	17	6	
		5	
904	7	6	
9 mos. =			¾ of a year.
4)2713	2	6	
6,78	5	7½	
20			
15,65			
12			
7,87			
4			
3,50			

Ans. £6 15 7¾ ½

= £6 15 7¾ ½

NEW METHOD.

£180⅞ for 1 month is £0 15 0¾ ½
9

Ans. £6 15 7¾ ½

Answers to the Questions which do not have the Answers given in the work :—

PAGE 24.

£0 9 0	£1 5 8
0 9 6	1 17 4
0 14 0	3 3 0
0 15 8	3 14 2
1 1 3	4 13 4
1 9 6	6 12 0
1 17 11	7 4 0

PAGE 27.

£0 5 $2\frac{1}{2}$	£4 12 $1\frac{5}{8}$
0 8 $11\frac{1}{2}$	6 13 $3\frac{5}{8}$
0 15 $3\frac{3}{4}$	7 9 $7\frac{1}{5}$
0 18 $9\frac{1}{4}$	9 6 $0\frac{9}{16}$
1 11 $1\frac{3}{4}$	3 15 $1\frac{1}{8}$
2 5 $3\frac{3}{4}$	4 7 $10\frac{7}{8}$
2 15 $1\frac{1}{2}$	8 5 0
3 19 4	9 1 $1\frac{1}{2}$
4 3 $10\frac{1}{4}$	13 7 $4\frac{1}{2}$
5 2 $7\frac{7}{8}$	17 6 $10\frac{1}{2}$

PAGE 29.

£0 11 $4\frac{1}{2}$	£4 5 $11\frac{1}{16}$
0 18 $2\frac{1}{8}$	5 9 $2\frac{1}{4}$
1 2 $9\frac{1}{8}$	12 14 $10\frac{1}{8}$
1 9 $10\frac{1}{2}$	25 4 $5\frac{1}{8}$
1 17 $11\frac{7}{16}$	34 3 $0\frac{3}{11}$
1 19 $10\frac{11}{12}$	38 16 $0\frac{7}{8}$
2 10 $3\frac{4}{12}$	45 19 $3\frac{5}{8}$
2 18 $3\frac{1}{2}$	3 6 6

PAGE 33.

£3 5 4	£4 0 0
3 3 9	21 16 3
3 10 $5\frac{1}{2}$	33 12 $10\frac{1}{2}$
5 19 $5\frac{3}{4}$	12 4 9
2 1 0	38 5 $3\frac{3}{4}$
2 18 11	27 16 $8\frac{1}{4}$ $\frac{6}{8}$

PAGE 44.

£49	10	0
7	4	1
8	19	8
2	5	0

£18	2	3
19	11	0
33	15	0
2	1	$1\frac{3}{4}$

PAGE 58.

£21	0	0
47	5	0
48	2	0

£45	3	9
80	2	$2\frac{1}{4}$
20	4	$4\frac{1}{4}$

PAGE 67.

£0	15	0
2	13	4
3	3	6
10	8	$7\frac{1}{4}$ $\frac{1}{8}$

£2	2	3
6	0	0
0	18	9

PAGE 68.

£0	10	0
0	14	$0\frac{3}{4}$
1	4	7
1	19	$0\frac{3}{4}$
2	5	$2\frac{1}{2}$ $\frac{1}{2}$
1	19	$7\frac{2}{4}$ $\frac{1}{2}$

£3	12	10
2	0	$9\frac{1}{2}$ $\frac{1}{4}$
1	9	$7\frac{3}{4}$ $\frac{1}{8}$
0	18	9
8	15	0

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